INDEX NUMBER · INDEKS-UITGAWE

MEDICAL PROCEEDINGS

MEDIESE BYDRAES

A South African Journal for the Advancement of Medical Science

'n Suid-Afrikaanse Tydskrif vir die Bevordering van die Geneeskunde

Registered at the General Post Office as a Newspaper

By die Hoofposkantoor as Nuusblad Geregistreer

Vol. 3 · No. 26 · 5s.

Johannesburg
21 December 1957 Desember 21

Jaarliks £1 : 1 : 0 Yearly

IN THIS ISSUE · IN HIERDIE UITGAWE

The Challenge of Space · Die Uitdaging van Ruimte

Cervical Teratoma

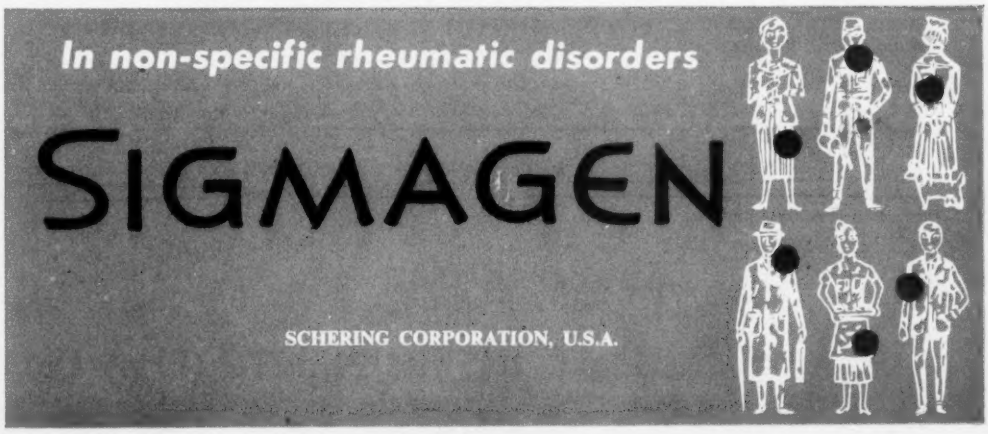
Common 'Minor' Injuries

Pavlov's Contribution to Psychological Medicine

Notes and News · Berigte

Preparations and Appliances · Preparate en Toestelle

Index of Contents (P. ix)



Publishers: Juta and Co. Ltd.
P.O. Box 1010 · Johannesburg: P.O. Box 30 · Cape Town

Uitgewers: Juta en Kie. Bpk.
Posbus 1010 · Johannesburg: Posbus 30 · Kaapstad

XUM

SICO-HASTINGS DIAGNOSTIC SET

Made by Gowllands, Ltd., Croydon

This set consists of the following components which are illustrated in the picture above:—

May ophthalmoscope with illuminated and magnified numbers, auriscope with three black anodised (all metal) interchangeable speculae, Duplay nasal speculum, bent arm throat lamp, laryngeal and post-nasal mirrors, metal tongue depressor, large battery handle and spare lamp.

The case itself is moulded from SPECIAL SHOCK-RESISTING bakelite, black in colour and with a very hard scratch-resisting surface. The material is of a very special tough grade.

The design of the case has been specially produced by a well-known industrial artist; it is modern, harmonious, pleasing as well as being well fitted for its purpose. The modified standard Gowlland catch is non-ferrous and rustproof. The lid is fixed to the base of the case by means of five patented spring hinge members; these are of steel but rustproof plated.

The blue impervious rubber pad for the instruments is both hygienic, silent, particularly handsome in appearance and enables the instruments to be carried conveniently and without shake. The lid is lined with a pad covered with satin finish Royal Blue P.V.C. sheeting.

Price complete as illustrated and described £13-10-0

GURR SURGICAL INSTRUMENTS (Pty.) Ltd.

Harley Chambers Kruis Street P.O. Box 1562

JOHANNESBURG

NEW BROAD SPECTRUM
ANTIBIOTIC THERAPY

TETREX

TETRACYCLINE BRISTOL

FAST - DOUBLY HIGH
BLOOD LEVELS

NOW *effective-safe, B.I.D. dosage*
Unmatched Clinical Safety

Capsules
Syrup
Pediatric Drops

Bristol
LABORATORIES, INC.
SYRACUSE, NEW YORK
U.S.A.

Distributed by
BRISTOLABS (PTY.) LTD. P.O. BOX 2515 JOHANNESBURG

XUM

WITHIN THREE YEARS

No less than 150 medical publications have discussed the restorative use of Megimide and Daptazole with barbiturates and morphine.

MEGIMIDE

Brand of Bemegride

in Barbiturate Poisoning and Anaesthesia

"Whatever its mode of action, there is no doubt that bemegride is a valuable advance in the treatment of barbiturate coma."

Lancet Leading Article ii (1956) 980.

MEGIMIDE

successfully counteracts the central nervous and respiratory depression produced by barbiturates.

"Megimide brings about a rapid recovery of consciousness in patients under light or deep barbiturate anaesthesia."

Med. Proc. (1956) April, 200.

DAPTAZOLE

Brand of Amiphenazole

with Morphine in the control of severe pain

DAPTAZOLE prevents respiratory depression and other side effects of morphine and its derivatives, and permits their safe administration in doses adequate to procure complete analgesia.

"Our series now extends to 400 cases (of terminal carcinoma). There is no doubt at all that a deep and prolonged analgesia is obtained with morphine in the presence of amiphenazole."

Lancet ii (1956) 464

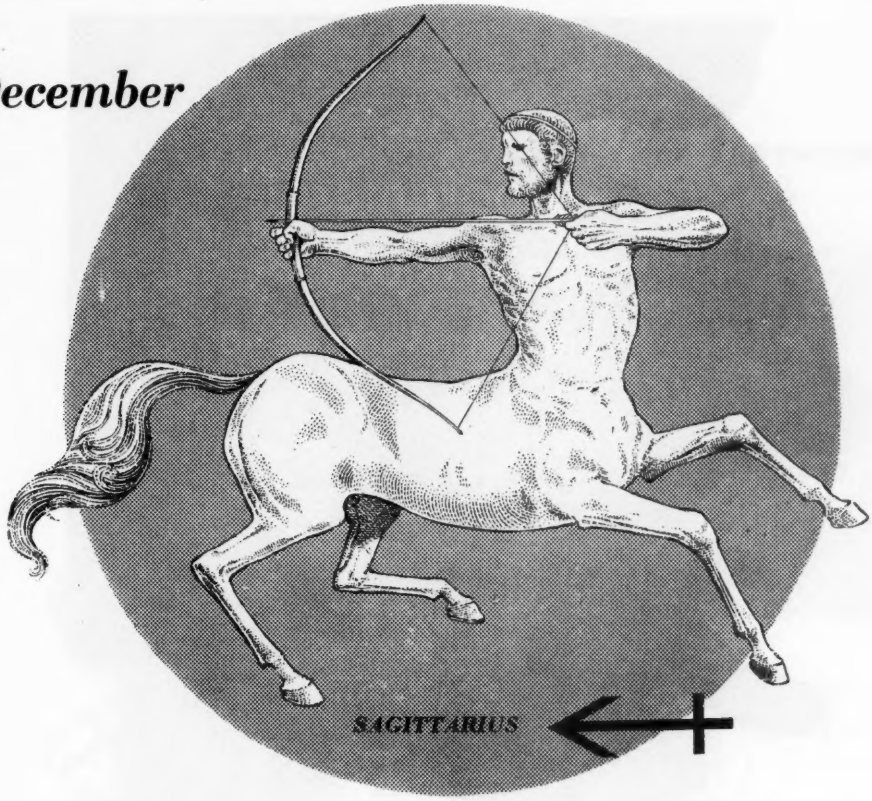
A. & G. NICHOLAS, LTD.,

Ethical Pharmaceuticals, Slough, Bucks., Eng.
Samples & literature on request from the distributors:

KEATINGS PHARMACEUTICALS, LTD.,

P. O. Box 256 • JOHANNESBURG

December



at this time of the year . . .

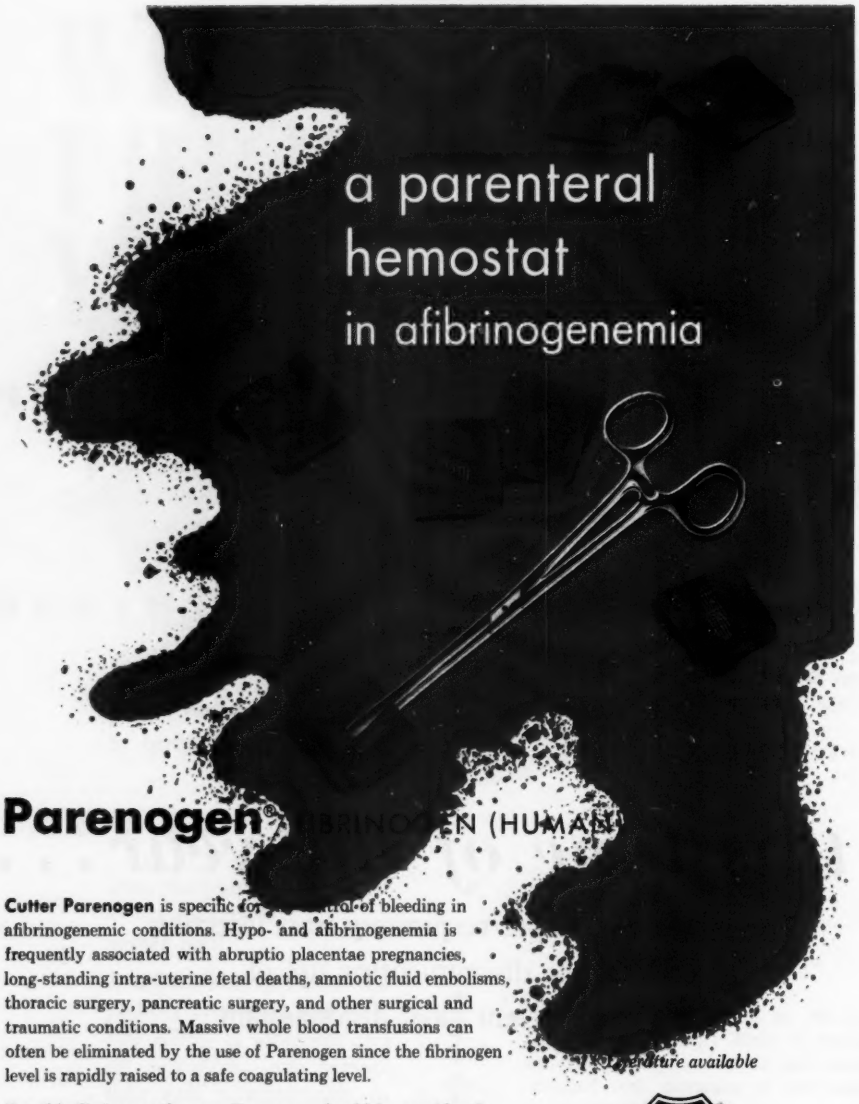
The increase in upper respiratory tract infection
calls for the discriminating use of
a safe and efficient nasal decongestant

IN A WORD . . . **Fenox** *NASAL DROPS*

Isotonic Nasal Drops
of Phenylephrine and Naphazoline.
½ fl. oz. dropper bottle.

B.P.D. (South Africa) (PTY) LTD., Trent House, 275 Commissioner Street, Johannesburg

Boots



Parenogen® FIBRINOGEN (HUMAN)

Cutter Parenogen is specific for the control of bleeding in afibrinogenemic conditions. Hypo- and afibrinogenemia is frequently associated with abruptio placentae pregnancies, long-standing intra-uterine fetal deaths, amniotic fluid embolisms, thoracic surgery, pancreatic surgery, and other surgical and traumatic conditions. Massive whole blood transfusions can often be eliminated by the use of Parenogen since the fibrinogen level is rapidly raised to a safe coagulating level.

For this fibrinogen therapy, Parenogen should be considered when the fibrinogen level falls below 100 mg. %.

Parenogen is the only commercially prepared human fibrinogen available. Each vial is derived from normal human plasma and is bacteriologically sterile, non-pyrogenic and has been subjected to ultraviolet radiation.

Be sure Parenogen is available in your O.R. when you need it.

Literature available

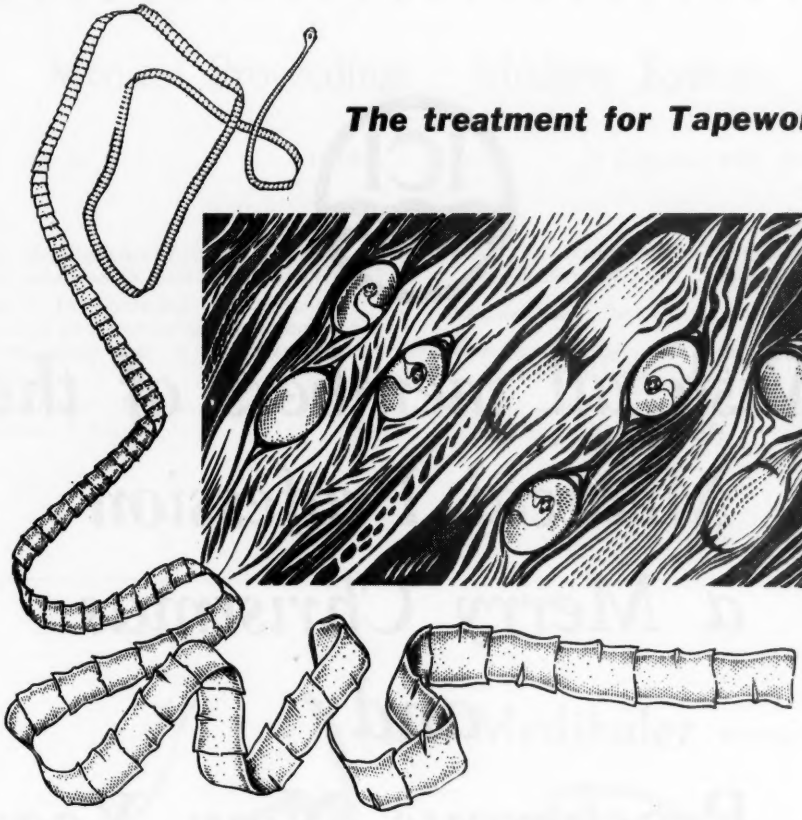
SINCE CUTTER 1897

CUTTER *Laboratories*
Berkeley, California

Distributors for Southern Africa:
PROTEA PHARMACEUTICALS LIMITED
7 Newton Street, Wemmer, Johannesburg
P.O. Box 7793 Telegraphic Address "MANLU" Telephone: 33-2211

XUM

MA4756



The treatment for Tapeworm

A single dose of 'Anthiphen' is almost invariably effective, particularly in the treatment of *Taenia saginata* infestations. Dichlorophen is very well tolerated, and spares the patient all the discomfort of dietary restriction and purging drugs. When tapeworm infestations are treated with this drug, the parasites undergo disintegration in the intestinal tract and are expelled in an often unrecognizable form. *Detailed information is available on request.*

'ANTHIPHEN'
trade mark brand
DICHLOROPHEN
SUPPLIED IN 0·5 GRAMME TABLETS

M&B

An M&B brand Medical Product

MAYBAKER (S.A.) (PTY) LTD
P.O. BOX. 1130 · PORT ELIZABETH
TEL: 89011 (3 LINES)

XUM

ICI

Wish all members of the Medical Profession a Merry Christmas and a Prosperous New Year

I.C.I. SOUTH AFRICA (PHARMACEUTICALS) LIMITED

3137

Medical Proceedings · Mediese Bydraes

Vol. 3 · No. 26 INDEX · INHOUD 21 December 1957 Desember 21

Editorial: The Challenge of Space—*I'll put a girdle round about the earth in forty minutes* 613

Redaksioneel: Die Uitdaging van Ruimte—*Ek sal die aarde binne veertig minute omgord* 613

Cervical Teratoma. *Mr. A. E. Wilkinson, F.R.C.S.* 614

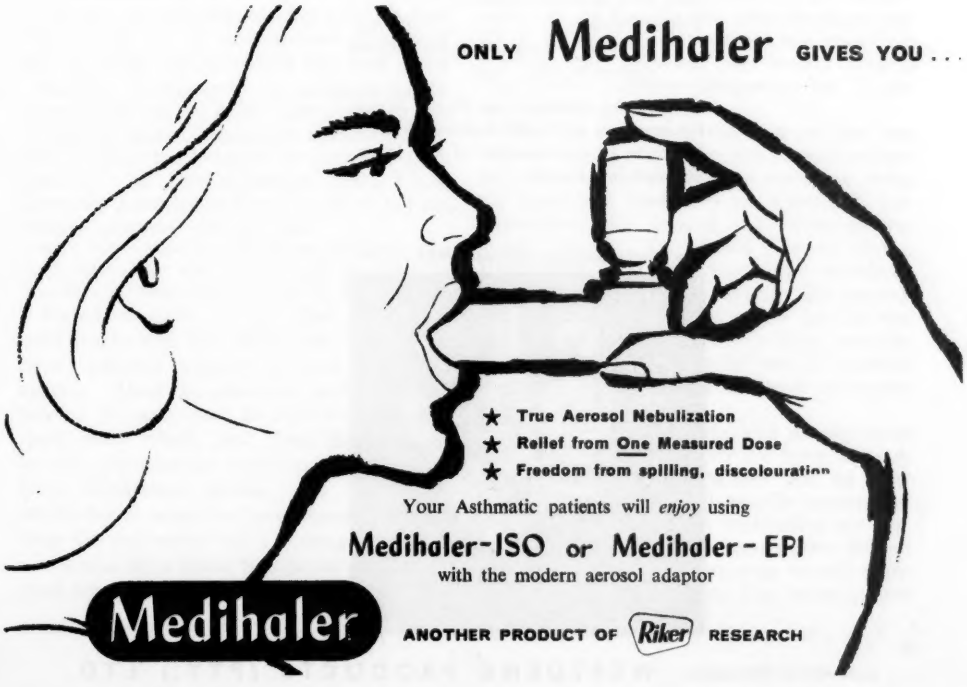
Common 'Minor' Injuries. *Mr D. S. Chapman, F.R.C.S.* 616

Pavlov's Contribution to Psychological Medicine. *Prof. K. R. L. Hall* 629

Notes and News : Berigte 636

Preparations and Appliances: Lederkyn (Sulfamethoxypyridazine) Lederle 636

Preparate en Toestelle: Lederkyn (Sulfametoksipiridasien) Lederle 636


ONLY Medihaler GIVES YOU . . .
★ True Aerosol Nebulization
★ Relief from One Measured Dose
★ Freedom from spilling, discolouration
Your Asthmatic patients will *enjoy* using
Medihaler-ISO or Medihaler-EPI
with the modern aerosol adaptor
Medihaler
ANOTHER PRODUCT OF Riker RESEARCH

XUM

Upjohn

"Triggers" effect of vasopressors:

Solu-Cortef*

Each 10 cc. size vial contains:
Hydrocortisone . . . . . 100 mg.
(present as hydrocortisone sodium succinate, 133.7 mg.)

Prepare by adding 2 cc. Sterile Water for Injection or Sterile Sodium Chloride Injection to the contents of one 10 cc. size vial Solu-Cortef.

*TRADEMARK

The Upjohn Company, Kalamazoo, Mich., U.S.A.

South African Distributors: WESTDENE PRODUCTS (PTY.) LTD.
burg: 23 Essanby House, 175 Jeppe Street.
n: 408 Grand Parade Centre, Castle Street,
Durban: 66/67 National Mutual Building, Smith Street.
Pretoria: 210 Medical Centre, Pretorius Street.

XUM

MEDICAL PROCEEDINGS

MEDIESE BYDRAES

A South African Journal for the Advancement of Medical Science

'n Suid-Afrikaanse Tydskrif vir die Bevordering van die Geneeskunde

P.O. Box 1010 · Johannesburg | Posbus 1010 · Johannesburg

Vol. 3 | 21 December 1957 Desember 21 | No. 26

EDITORIAL · REDAKSIONEEL

THE CHALLENGE OF SPACE

'I'll put a girdle round about the earth
In forty minutes'

Shakespeare, *A Midsummer Night's Dream*

The scientific achievement of placing artificial satellites in predictable orbits around the earth is a consummation of the efforts of physicists which will be remembered long after we have forgotten about the international geophysical year in which this incredible feat took place.

But the launching of the satellites constitutes a challenge not only to physicists but also to medical science because the advent of Sputniks I and II has heralded the dawn of space medicine. Sir Harold Spencer Jones, F.R.S., (formerly Astronomer Royal at the Cape) has recently expressed the view that

'within a few years we may see the launching of a small vehicle that will either impact the Moon or will circle the Moon and return to the Earth'.[1]

To go on such journeys Man will clearly need to take with him (apart from fuel for the return journey) supplies of food, drink and oxygen. These fundamental needs must be worked out in relation to conditions in outer space about which, until now, the most informed physiologists could only have made fairly uninformed guesses. The information which Soviet scientists have already acquired from the dog which was a passenger in Sputnik II will lay a sound foundation for solving these new problems of nutritional and respira-

1. *The New Scientist*, 10 October 1957, p. 8.

DIE UITDAGING VAN RUIMTE

,Ek sal die aarde binne veertig minute omgord'

Shakespeare, *'n Midsomersnagdroom*

Die wetenskaplike prestasie om kunsmatige satelliete in voorspelbare bane rondom die aarde te plaas, kan beskou word as die hoogtepunt van die pogings van natuurkundiges, en sal in die herinnering voortleef lank nadat die internasionale geofisiese jaar waarin hierdie ongelooflike prestasie plaasgevind het, in die vergetelheid geraak het.

Maar die van stapel stuur van die satelliete is 'n uitdaging nie alleen aan natuurkundiges nie, maar ook aan die mediese wetenskap, want die koms van Sputnik I en Sputnik II het ongetwyfeld die daeraad van ruimte-geneeskunde ingelui. Sir Harold Spencer Jones, F.R.S. (die voormalige koninklike sterrekundige aan die Kaap) het onlangs die mening uitgespreek ,dat ons binne enkele jare die van stapel stuur kan beleef van 'n klein vervoermiddel wat òf die maan sal tref, òf rondom die maan sal trek en na die aarde sal terugkeer'.[1]

Vir sulke reise is dit duidelik dat die mens (afgesien van brandstof vir die terugreis) ook voedsel, water en suurstof met hom sal moet saamneem. Hierdie fundamentele vereistes sal uitgewerk moet word in verhouding tot toestande in die buite-ruimte waaromtrent die bes ingeligte fisioloë tot dusver slegs taamlik oningeligte gissings kon doen. Die inligting wat

1. *The New Scientist*, 10 Oktober 1957, bl. 8.

XUM

tory physiology. Without this precise knowledge Man cannot embark on travel into outer space.

There is a kind of poetic justice which conceded to the Russian scientists the initial success in this sphere. The sending of a dog as the first satellite traveller was only possible by training it to feed on signal. The basis for this training was created by Pavlov, a Russian, and one of the greatest physiologists of all time. His work on the conditioned reflex in animals (especially dogs) was, in a sense, a prophetic contribution to the most recent achievement of Russian science.

The precision with which scientists have hurled an artificial satellite into a pre-determined orbit should lessen the hazards of interplanetary travel. It is, however, disturbing to reflect that if the speed of launching such a satellite is increased from the present 5 miles per second to just slightly more than 7 miles per second, the satellite will fly off into space and never return.

die Sowjet-wetenskaplikes reeds verkry het van die hond wat 'n passasier in Sputnik II is, sal 'n hegte grondslag lê vir die oplossing van hierdie nuwe probleme van voedings- en asemhalingsfisiologie. Sonder presiese kennis in hierdie verband kan die mens nie op reise na die buite-ruimte vertrek nie.

Daar is 'n soort poëtiese regverdigheid in die feit dat aanvanklike welslae in hierdie sfeer deur Russiese wetenskaplikes behaal is. Die versending van 'n hond as die eerste satellietreisiger was slegs moontlik nadat die hond geleer is om op 'n teken te vreet. Die grondslag vir hierdie opleiding is gelê deur Pavlov, 'n Rus en een van die grootste fisioloë van alle tye. Sy werk in verband met die gekondisioneerde refleks by diere (veral honde) was, in 'n sekere sin, 'n profetiese bydrae tot die jongste prestasie van die Russiese wetenskap.

Die presiesheid waarmee wetenskaplikes 'n kunsmatige satelliet in 'n vooraf vasgestelde baan geslinger het, behoort die gevare van reise tussen die planete te verminder. Dit is egter verontrustend om daaraan te dink dat as die snelheid waarmee die satelliet van stapel gestuur word van die huidige vyf myl per sekonde tot effens meer as 7 myl per sekonde vermeerder word, die satelliet in ruimte sal invlieg en nooit weer sal terugkeer nie.

CERVICAL TERATOMA

A. E. WILKINSON, F.R.C.S. (ED.), F.R.F.P.S. (GLAS.)
Coronation Hospital and University of the Witwatersrand, Johannesburg

A review of the literature on cervical teratoma, published by Thomas in May 1957, stated that 67 cases had been reported. Thomas added two cases. As this is a rare condition, it is felt that two additional cases are worth recording.

CASE 1

A Bantu male, aged 24 years, was admitted to Coronation Hospital on 10 September 1956. He complained of a large swelling on the front of his neck. He could remember it from early childhood. There was no dyspnoea or dysphagia.

He was a well-developed male adult. An irregular lobulated mass protruded from below his chin, extending down to the root of his neck and overlapping the suprasternal notch by 2 inches (Figs. 1 and 2). It occupied the whole of the front of the neck and protruded over its left lateral margin. Three sinuses (from which pus exuded) were present anteriorly. The mass, which was firm in consistency, had 2 small areas of fluctuation and did not move on swallowing.

X-ray examination showed patchy areas of calcification and narrowing of the trachea about 1½ inches below the vocal cords (Fig. 3).

At operation (performed by Mr. S. Kay) the tumour was found to extend deep to the strap muscles but was superficial to the pretracheal fascia. It was enucleated without difficulty. It was not attached to the thyroid gland. Post-operative progress was uneventful.

Pathology. On cross-section the tumour had a very variegated appearance (Fig. 4). Many cystic areas, filled with mucus, were present. Areas of cartilage, calcification and fibrous tissue comprised most of the remainder.

The histological report by Dr. R. F. Dorfman read:

'Sections of the specimen from the neck show the presence of a teratoma, the predominant element of which is made up of mucus-secreting cells.

These cells are dispersed widely throughout the supporting tissues and in many parts have lost their normal orientation. In many cases they appear to be lying within endothelial-lined spaces.

These histological features are strongly suggestive of malignant degeneration.'

CASE 2

A Bantu child, aged 2 months, was admitted to the Non-European Hospital on 19 May 1954. She had a swelling of the left side of her neck, present from birth (Fig. 5). The birth had been normal.

The swelling measured 6 × 4 × 4 inches and extended from below the left eye to the left ear. It bulged down over the neck and the left side of the chest. It was cystic and translucent. No other congenital abnormalities were present.

At operation a definite line of cleavage was found present between the tumour and the superficial fascia of the neck. The tumour was excised by Mr. P. Keen. Recovery was uneventful.

Pathology. The tumour consisted of solid masses of tissue with cystic spaces.

The histological report by Dr. J. C. Wagner read:

'Sections of this specimen from the left side of the face and neck show the histological features of a teratoma in which elements of brain, salivary gland, gut, branchial epithelium and mucus-secreting glands have been identified.'

Summary. Two cases of cervical teratoma are described.

OPSOMMING

Teratomas van die nek word behandel en uit die literatuur blyk dit dat daar tot dusver nog net 69 gevalle beskrywe is.

Twee verdere gevalle word gemeld, die een waarvan in 'n volwasse Bantoe voorgekom het. Hierdie was 'n groot swelsel wat van die ken gestrek het en tot oor die bo-ent van die sternum gehang het.

Die tweede geval het in 'n Bantoe baba van 2 maande voorgekom. Die grootte van die swelsel was 6 × 4 × 4 duim.

Altwee hierdie teratomas was suksesvol verwyder en by die operasie is gevind dat hulle maklik uitgedop het.

Die patologiese ondersoeke het die diagnose bevestig en die volledige rapporte word gegee.

I wish to thank Mr. P. Keen, Dr. M. Tonkin and Mr. S. Kay for permission to publish these cases.

I am indebted to Drs. Wagner and Dorfman for the histological reports.

REFERENCE

1. Thomas, O. R. (1957): Brit. J. Surg., **44**, 625.

COMMON 'MINOR' INJURIES

DAVID S. CHAPMAN, M.B., B.S., F.R.C.S. (ENG.)
Department of Surgery, University of Natal, Durban

Because the end results of many so-called 'minor' injuries can be very distressing, a review of some of these injuries and their complications is warranted. All surgery, no matter for how trivial a condition, has its unexpected complications and exacts its penalties, e.g. the disabling painful stiffness frequently found after the common Colles' fracture or the spreading sepsis of soft tissues or skull following scalp wounds.

The term 'minor' has never been satisfactory as many injuries, though small in extent when first seen, require major repair either initially or subsequently. Stab wounds, so common in this country, are often treated lightly, yet a stab in the arm may cripple a man. Other misleading terms are 'simple' and 'compound' as referred to fractures. 'Simple' fractures are often difficult to treat and are better described as 'closed', which indicates the important feature that the skin is intact. The 'compound' fracture is better described as 'open', which indicates at once the presence of contamination and does not imply a multiplicity of injuries or difficulty in treatment, as the word 'compound' is often taken to mean. Similarly wounds of soft tissues should be classed as 'closed' and 'open'.

It is proposed to deal with a number of injuries prone to serious complications, some of which require more care and attention than are often given, as well as a group of conditions where serious complications follow apparently minimal trauma.

THE PRINCIPLES OF TREATMENT

Certain basic principles of surgical management govern the treatment of injuries and these deserve detailed consideration.

1. Control of immediate bleeding.
2. Asepsis and operative technique.
3. Sedation.
4. Antibiotics and antisera.
5. Control of the swelling of trauma.
6. Splinting and rest.
7. After care.

1. CONTROL OF IMMEDIATE BLEEDING

Some apparently trivial wounds, especially stab wounds of scalp or limb, may have torrential haemorrhage from an artery or from veins. Bleeding from almost any wound on a limb can be effectively controlled by firm local pressure of a well-applied pad, re-inforced if necessary by hand and aided by elevation. Within a short time even large vessel ends will seal themselves and this haemostasis will be secure until the wound is examined. There is no need for a tourniquet, which carries with it many dangers such as nerve palsies, local skin death or irrecoverable injury of the whole limb. The tourniquet can also give a false sense of security when, in fact, it is only obstructing the venous return, so producing more profuse bleeding than before and suffusing the tissues with blood. If a tourniquet is ever to be used, it should be flat, wide and padded.

2. ASEPSIS AND OPERATIVE TECHNIQUE

The operative technique used for 'minor wounds is really dependent on an attitude of mind. A casual attitude, for instance, towards a small wound of the hand, will lead to its being sewn up without inspection for nerve and tendon damage, without wearing a mask, with the use of thick and heavy sutures and repeated touching of instrument ends and materials with the fingers.

As careful a toilet and suture of small wounds is necessary as for those formally treated in an operating theatre. When the wound is examined, the doctor and all attendants as well as the patient should be masked. Surrounding hair must be cut away and the wound cleansed first and then covered with a sterile pad whilst the area around is cleaned. Sterile gloves should be worn or, if these are not available, a scrupulous no-touch technique followed. When hands are 'scrubbed-up' they are only socially and not surgically clean—fit

XUM

only to shake hands with a neighbour—and dry hands are safer than wet ones. To save time and to avoid touching the suture material, it is an advantage to have it already threaded in suitable lengths on needles in batches, the whole readily sterilized in packets.

In the wound toilet all foreign bodies, including hairs, non-viable tissues and blood clots are removed. Disrupted anatomy is repaired or recorded for later reconstruction. The wound is closed edge to edge with the finest material. Seldom is it necessary to use suture greater in calibre than size 2/0 and where fine scars are essential, as in the hand and face, size 4/0 is sufficient. All dead spaces should be closed by deeply placed skin sutures, by separate suture of deep fasciae or aponeuroses, or by a pressure dressing. Organization of a blood collection leads to fibrosis, stiffness and disability. Blood is also a good culture medium, a ready source of infection.

A simple, dry dressing should be applied and left until the sutures are removed. If the wound edges are perfectly apposed, wound adhesion is effective in less than 12 hours and no infection can then occur from without.

Even with the use of an antibiotic, wounds over 18 hours old should be assumed to be infected, left open and a delayed primary or secondary suture performed later.

3. SEDATION

Pain can always be relieved. The careful technique of treatment alone will help—by the gentle handling of tissues (which reduces oedema), by the proper reduction and fixation of fractures (which relieves painful, uncoordinated muscle spasm) and by the control of the swelling of trauma. There can, however, be as much pain after a fracture manipulation as before. Morphine is still the most efficient analgesic available, but codeine or pethidine can be used to give a night's rest.

4. ANTIBIOTICS AND ANTISERA

An antibiotic is not essential for the clean, incised wound. The staphylococcus and the streptococcus are the commonest primary contaminants and are in most cases penicillin-sensitive.

Tetanus Antiserum: If a wound has bled freely and is wide open, tetanus is unlikely to occur. Prophylaxis is then not essential for all wounds, but with agricultural workers the risk cannot be taken. The puncture wound is the most dangerous. Using the full dose of antiserum in an individual who has not previously been protected by the toxoid may result in sudden, fatal anaphylaxis. Therefore, first a subcutaneous test dose of 0.1 ml. should be given to elicit a general reaction,[1] but only with a syringe charged with adrenaline at hand to deal promptly with an untoward response. Testing for sensitivity to the serum by a skin reaction after an intradermal injection, the usual method is unreliable.[2]

If the individual has been protected by tetanus toxoid before, a booster dose should be used, following which there is little risk of anaphylaxis. Parrish[1] summarized his work thus:

> 'Protection by antiserum is at its maximum within two or three days of injection and then slowly diminishes as the serum is eliminated. Occasionally, however, the duration of adequate immunity may be only a few days in some sensitive persons who have had previous injections of horse serum.'

From studies in the British and American armies, it seems that the disease could be almost eradicated if active immunization by toxoid was extended to the whole population. It has been shown that booster doses should be given at 3-year intervals or whenever a suspicious wound is seen.

Anaphylactic reactions to both penicillin and antisera are frequent and dangerous enough to have stimulated many investigations into their prevention and treatment. Cortisone has on occasion been life saving in acute penicillin anaphylaxis and there is some recent evidence from American sources that it might be useful, with adrenaline, for serious tetanus antiserum anaphylaxis. Antihistamines are now being used widely prophylactically against penicillin reactions, given either in the same syringe with the crystalline preparation, or separately when an oily penicillin preparation is used.[9] There has thus been a marked fall in the incidence of reactions. Antihistamines might be used with advantage with injections of antisera as well.

5. CONTROL OF THE SWELLING OF TRAUMA

The reduction of the swelling of traumatic oedema and blood suffusion into soft tissues is of fundamental importance.

Oedema, although maximal in 48 hours, is immediate in onset. It causes early pain by tension and later, fibrosis which leads to muscle and tendon adhesions, joint stiffness and reduced fluid return. In this way it produces a vicious circle.

Traumatic Oedema. There are two efficient methods of control, the pressure dressing and elevation. Both should be used immediately

XUM

on completion of the examination or the operation. However, if a part is already grossly swollen, pressure can be dangerous.

i. *The Pressure Dressing.* The thicker the amount of wool and the thinner the layers which are used, the safer, tighter and more evenly can the dressing be applied. A crepe bandage is used to give the pressure and is applied just short of full stretch. The usual tendency is to use too little wool. The more distal the injury, the more distal still should the pressure carry; for an ankle dressing, for example, the foot as far as the toe bases should be included, otherwise the foot may swell alarmingly.

ii. *Elevation.* The injured part must be raised above the level of the heart and this, in the case of the lower limb, requires many pillows or the use of a Braun's frame or elevated Thomas' splint. Raising a lower limb on one pillow is ineffective elevation. If ambulant, the patient should not bear weight and should be encouraged to raise the leg whenever possible on a chair or stool.

The swollen hand should be in a sling held high on the opposite chest wall with the digits over the clavicle; alternatively, an inclined plane of pillows can be used.

Contusions. Blood must be removed early. If the collection is fluid it should be aspirated and a pressure dressing applied to prevent further collection. If it is clotted, a short incision using an aseptic technique, allows expression of the clot.

However, in many contusions such as with sprains, the blood is suffused in tissues and tissue planes and is not removable by aspiration. Injections of hyaluronidase in these cases can dramatically aid dispersal. It is especially valuable for a peri-orbital haematoma where injections of a total of 2.0 ml. into and around the eyelids can resolve the condition overnight.

Pressure dressings and elevation are as effective in dealing with contusions as they are with traumatic oedema.

Large contusions in the muscles of the thigh and back, where pressure and elevation cannot be effectively applied, are helped by massage started as soon as possible.

Many athletes suffer from rheumatism and lumbago because they have fibrosis in muscle tears where blood was not satisfactorily removed at the time of injury.

6. SPLINTING AND REST

Immobilization after injury is a natural phenomenon, and inflammations, whether bacterial or traumatic, tend to have the surrounding parts splinted by co-ordinated muscle spasm.

The need to splint fractures is recognized, but all wounds should be splinted—those of soft tissues as well as of bone. If fractures are left for some hours without a splint, more bleeding and pain are produced and there is the danger that the closed fracture may become open. Even the fracture which is to be taken to the theatre immediately should be splinted, and in deformity if necessary. The adage 'Splint 'em where they lie' is just as appropriate in a hospital bed as it is at the scene of the accident.

Efficient emergency splinting means rest to the part and relief of painful muscle spasm. In addition, it may assist replacement of injured soft parts to their original anatomical state, so that tears become linear and the fibrosis of healing minimal. Splinting does not necessarily mean the provision of specially manufactured wooden or other rigid appliances.

The upper arm can be efficiently splinted by placing it in a sling and binding the whole firmly to the chest wall. The forearm and wrist can have a simple plaster of Paris gutter, resting in a sling, and an injured hand can be well splinted by liberal wool padding and bandaging, possibly in the form of a boxing glove.

For the lower limb the Thomas' splint can be used for all injuries, except those of the foot, with the limb secured on the splint by bandaging, plaster of Paris (Tobruk plaster) or traction on the boot. In the last World War, many soldiers with multiple soft tissue injuries or fractures of the lower limb travelled long distances safely and comfortably with such splinting. For fractures of the leg proper, a plaster of Paris U sling can be applied to the leg and foot in deformity, reinforced by 3 wide plaster slabs slipped horizontally behind the calf and turned over anteriorly. Wooden back splints can never conform to the shape of a leg and it is not possible to secure a limb on one for long. Without plaster of Paris available, it is more effective to tie both lower limbs securely together. Gissane[3] has designed a simple foam rubber splint that can be applied to any injured leg, conforming to the shape of the leg and allowing the patient to be transported in comfort both from the accident and through the various departments in hospital.

Recently a motor cyclist was found in the road with a closed fracture of the femoral shaft. No splint was available, but it only required traction by

holding the foot firmly to make him immediately comfortable and this traction was maintained by the attendant during the ambulance trip to hospital.

Radiographers often have the thankless task of taking X-rays of twisted unsplinted limbs, perhaps with the aid of a porter. The fresh damage to the limb and the increase of shock by the inevitable movement is not always realized.

7. AFTER CARE

To avoid infection, blood collections must be promptly released, sutures of tight wounds removed, frequent dressings (especially wet ones) avoided and ventilation of the part promoted.

Movement which rapidly disperses fluid and prevents adhesions has to be balanced against the need for rest, so essential to the repair of soft tissues. They are not so opposite in effect as might be thought and are usually used together, resting the immediate zone of injury and keeping the parts around mobile. The normal fingers of a child can be completely immobilized for a month with a full return of mobility on the day of release, but an old lady similarly confined might have her digits fixed permanently.

Early supervised movements of neighbouring joints is encouraged, especially to prevent joint stiffness and wasting of muscle masses. The quadriceps (on which knee stability and ambulation ultimately depend) can lose half its bulk within a few days of a lower limb injury if muscle drill is not comenced at once.

A knowledge of the patient's work and his capabilities for adjustment is required so that some form of rehabilitation, supervised in the factory or hospital, is instituted. Full cooperation must be maintained with a physiotherapist and regular attendance at a clinic is essential.

PROBLEMS OF CLOSED INJURIES

1. SPRAINS

These, the commonest closed injuries of soft tissues, include tears and contusions, especially of ligaments, muscles and joint capsules.

Blood visible under the skin is readily diagnosed as a contusion, but with every sprain there is extensive soft tissue injury in depth, with bleeding and traumatic oedema.

Too much stress is laid on X-ray findings, yet a sprain of the ankle often leaves a greater disability than a fracture-dislocation, mainly because in the fracture-dislocation it is the sprain part of the injury which gives most of the residual stiffness and pain. In fact, the associated soft tissue injury in many fractures dominates the picture clinically and therapeutically. The hidden retroperitoneal blood loss and the rupture of the bladder or the urethra are the important features in many a fractured pelvis. Disrupted soft tissue parts must be re-aligned anatomically so that tears will heal with minimal separation. Blood and oedema must be removed and the part rested.

Fig. 1. Rotation fracture of leg.
A: Lateral view.
B: Front view.

Fig. 1 shows a long spiral fracture of the tibia of a young man and on the same X-ray a further rotation fracture of the upper end of the fibula. In this rotation injury there has been a wound of the interosseus membrane and the muscles attached to it, between the two fracture levels. If the fracture is exactly reduced within a few hours, the soft tissues are likely to appose with little separation; but if the patient has any residual disability, it will be due to fibrosis in the leg by adhesions of the torn muscles in their sheaths along the line of the soft tissue injury.

Often with the common external rotation fracture-dislocation of the ankle (Pott's frac-

XUM

ture), despite apparently perfect reduction as shown by X-rays, there is a long disablement of pain, stiffness and swelling because the ruptured ligaments and capsule are not in apposition and the traumatic oedema has not been absorbed. If a pressure dressing is applied early and elevation prolonged, full painless movements will more likely be regained. Thus sprains and fracture-dislocations of the ankle should have non-weight bearing on crutches for some weeks and as much elevation as possible. An ankle sprain will benefit from plaster of Paris immobilization just as much as a fracture.

The Colles' fracture can be followed by a stiff wrist and fingers and even pain, sequelae which are not limited to older folk. By its nature there has been wide tearing of the capsules and ligaments around the wrist and bleeding under the flexor retinaculum; and the patient may end with a median nerve neuritis or palsy. These complications can be limited by resting the local injury. This is obtained by secure fixation of the reduced fracture in a plaster of Paris splint applied full or 3/4 circumference to the forearm (especially enclosing the radial side), elevation of the hand for at least 4 days in a sling or on pillows and supervised digit movements started immediately.

A sprain of the wrist alone is a rare injury —more commonly one of the variety of carpal bone dislocations or fractures occurs, especially that of the carpal scaphoid.

Sprains anywhere in children must be diagnosed with caution. There may have been an injury such as a twisted ankle or shoulder with the expected bruising, but a few days later osteitis is evident. On the other hand, the osteitis may already be under way when the child, because of a slight limp, 'twists' the ankle. When the history is given the recent injury is so prominent in the patient's mind that the past may be forgotten.

Local anaesthesia will relieve the pain of sprains. However, in ankle sprains the principle of using local anaesthesia is wrong as walking is inadvisable until oedema has subsided, aided by means of firm pressure; but in certain emergencies, such as in combatant troops, it is invaluable to keep them going and pain-free. When pressure cannot be applied, as in the back, a local anaesthetic injection is of benefit and massage and mobilization can be started early.

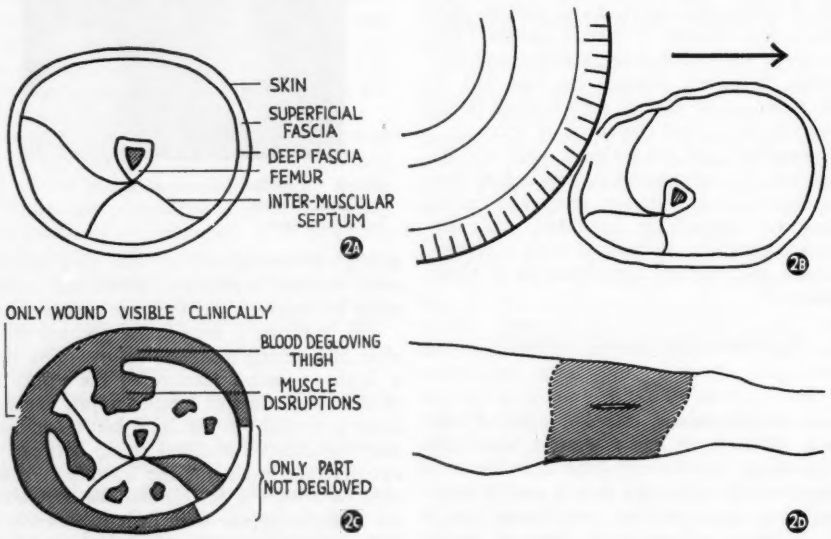


Fig. 2. The crushed limb.
A: Cross section of the thigh before injury.
B: Wheel crushing and rolling soft tissues on themselves. Note the break in the soft tissue continuity at the point near the wheel.
C: A cross section of the thigh: a possible picture after crushing.
D: Lateral view of the limb after injury showing a small linear wound and a possible area of de-gloving (shaded).

XUM

2. THE CRUSH INJURY

The crushed limb, a very serious type of closed injury, is often accompanied by extensive skin death. The 'intact' skin may be considerably bruised, abraded, be obviously dead or there may be de-gloving of skin. But this is not always the case and it may present as an apparently minor injury.

A boy is brought to the Casualty Department with a linear wound of the skin 2" long on the lateral side of the thigh. The ambulance attendant reports that the child was 'knocked down' or 'run over'. There is no fracture visible on X-ray. The skin of the thigh appears intact and the child looks well and has a normal blood pressure and pulse. The Casualty Officer is tempted to sew up the wound and allow the patient to go home; but the child may in fact be seriously injured, compensating shock for the moment. Despite the 'minor' wound apparent, what in truth has happened is an explosion from within by compression of the thigh by the vehicle wheel. Much skin may die later by the extensive de-gloving; muscles may suffer widespread disruption and bleeding; tendons and aponeuroses may be torn from their bony attachments and nerve trunks stretched into poor attenuated ghosts of themselves (Fig. 2). The boy is in urgent need of resuscitation, especially blood replacement. The equivalent of an adult fist volume of muscle crushing or blood collection means a pint of blood lost to the essential blood volume.[4] This equivalent measure is equally true for other injuries, such as an ankle fracture (which may have up to one pint of blood around it) or a thigh fracture (with a haematoma representing up to a 2-pint loss).[5]

After restoration of the blood volume, the crushed limb will require a full theatre toilet and exploration and possibly immediate skin grafting.

3. THE FOOT

The Metatarsus. A closed fracture of the metatarsus is truly a minor injury as there is no need for plaster of Paris immobilization or a long stay off work. Here again it is primarily the sprain part of the injury which needs treatment. The fracture cannot usually be manipulated nor can it be splinted with plaster of Paris any more efficiently than by the foot muscles. It does not tend to displace. If there is marked swelling, the patient should keep the foot elevated, aided by a pressure dressing. With little swelling, an elastic strapping is applied and crutches given to prevent weight bearing. In 3-4 days the patient may attempt walking with crutches. There is a temptation then to provide a soft slipper, but the patient should be encouraged to wear his own boot, which has a firm, rigid sole.

Similarly a closed fracture of metacarpal shaft (not head or neck) also does not require manipulation or plaster of Paris fixation; but the traumatic oedema must be relieved by high elevation in an arm sling and a pressure dressing. Early movements and use are encouraged.

The Big Toe. When a heavy weight falls on the big toe, this swells rapidly so that the skin may split and the nail be dislocated by the sub-ungual haematoma. There is often a comminuted fracture of the terminal phalanx and, if the skin is torn, it must be considered an open fracture.

When the swelling is gross, the foot should be elevated for 2-3 days. The patient can then take to crutches, non-weight bearing, and wear a solid soled shoe or boot as a satisfactory splint. If seen early, a collodion splint gives great comfort and can be applied directly over the split skin and loose nail. A loosened nail of the toe should be retained as it is an excellent splint for the injured pulp and fractured phalanx and also protects the tender nail bed. A painful haematoma under an intact nail can be decompressed by a puncture at the nail base.

4. THE CHEST

Fracture of a rib or ribs is the commonest closed chest injury. Even without respiratory complications, pain can persist at the fracture site for weeks after the accident. It is not possible to splint a broken rib, yet healing is satisfactory despite continuous chest movement. A support of bandaging or strapping does give a sense of security and comfort, but pain can most reliably be removed by a local oily anaesthetic injection at the fracture site or by a posterior intercostal block; both can be used together. Fractures may be difficult to see by X-rays, especially in fat people, and it is best to inject all locally tender areas. With multiple fractures in the elderly bronchitic who is subject to pneumonia, the use of a procaine drip infusion can be a life-saving measure by allowing full lung expansion; 1 g. procaine is dissolved in 500 ml. of saline and given at the rate of 160 drops per minute until the patient feels dizzy and thereafter at half this rate.[6] It may be continued or repeated as required.

The complications of a fractured rib are mainly mechanical problems. Fever and haemoptysis usually indicate a resolving pulmonary haematoma rather than pneumonia.

A small pneumothorax or haemothorax is common. Clinical signs are unfortunately misleading in the injured chest and an X-ray is required to exclude a large pneumo- or haemothorax. A small air or blood collection may become a large one within 24 hours.

A tension pneumothorax is uncommon, dramatic in onset and treated satisfactorily by

XUM

a simple pleural puncture. On the other hand, large pneumothoraces distressing to the patient are common. Subcutaneous surgical emphysema is often alarming but only means there is a pneumothorax which requires treatment.

The great danger of air or fluid in the pleural cavity is not infection but the loss of functional lung tissue, which may be permanent if blood clots and forms a thick rigid covering over the pleura. The aim is to get the lung fully expanded as soon as possible. Air is aspirated from a large pneumothorax with a 2-way tap on a syringe. If there is repeated refilling, intercostal drainage sealed under water should be adopted to encourage lung expansion and restoration of a negative pressure.

The haemothorax is usually caused by bleeding from the chest wall; but most of it is usually pleural exudate and remains fluid for a long time. Nevertheless, a large collection cannot all be re-absorbed, the lung will remain collapsed and re-expansion will be prevented by the pleural thickening. Except for a very small collection, blood should be aspirated daily, being replaced with a small quantity of aqueous penicillin. If the fluid collects repeatedly, under-water intercostal drainage should be used. It is necessary to have supervised daily chest exercises from the beginning of treatment.

A stab wound of chest wall, although small, causes the same complications already described. It is often missed in cases of multiple injuries. The incidence of moderate-sized or large pneumothoraces and haemothoraces is high. Bleeding can continue for so long that a blood infusion is needed to replace that lost and the chest wall and pleural cavity may require exploration for control of the bleeding point.

5. THE ABDOMEN

Blows on the abdomen are frequent by boot, elbow and balls. They should never be ignored, as they may readily cause a serious closed abdominal injury. Such closed injuries to viscera can also occur by acute flexion of the trunk, often in a simple manner, on the sports field, damage probably being caused by impact with the costal margin. Bowel will most likely be injured at junctions of fixed and movable portions, since at these sites it cannot move out of the way.

The closed injury presents a problem in diagnosis and treatment. These injuries should be carefully observed for at least 48 hours. A hole in the bowel may at first be closed by a prolapse of oedematous mucosa and the patient be apparently well with a normal pulse and temperature. The abdomen may be tender anywhere and this tenderness attributed to abdominal wall bruising. If one has any doubt, a laparotomy through a generous incision should be done and all the viscera thoroughly examined. 'It is safer to look and see than to wait and see.'

A footballer was brought into the Casualty Department by his team mates on their way home. He had been kneed in the epigastrium whilst heading the winning goal. He was nauseous and had some pain and slight tenderness to the left of the umbilicus, but looked well with a normal pulse. There was no rigidity and bowel sounds were normal. Four hours later, after uneventful gastric suction and observation, blood was withdrawn from the stomach, and his pulse then rose 10 points. There was still no change in the abdominal signs yet at operation a point rupture was found at the duodenojejunal flexure.

Traumatic rupture of the spleen is usually considered in a diagnosis and any blow on the left side of the abdomen or lower chest must be suspect and laparotomy not delayed if there is doubt. In the last 8 laparotomies for suspected splenic rupture, only 4 had a rupture, 2 of which had only minimal signs; yet of the 4 with no rupture found, 2 had classical signs which were due to a small haemoperitoneum only. It is evident that laparotomy is the final arbiter in these injuries.

The stab wound of the abdomen may be a little more obviously dangerous than the closed injury, but it requires none the less a full operative exploration of the wound to determine its extent. A viscus may be injured at a distance from the site of penetration—such may occur from goring by a bull's horns. The abdominal signs may be as misleading as those of a closed injury.

Probing the wound with a metal probe is dangerous because it may repeat the trauma and mislead, as penetration of the peritoneum cannot be diagnosed by this means.

Any abdominal injury, open or closed, may cause a variety of lesions from a pin-point perforation of bowel or tearing of mesentery, to a retroperitoneal rupture of colon or duodenum.

A kick in the back or loin may seem to produce nothing more than a muscle contusion but an X-ray revealing fractures of one or more vertebral transverse processes will explain the persistent subsequent backache. If movements are allowed too early, the action of the psoas and other muscles will increase the lake of blood between the fracture ends and torn,

XUM

ligamentous structures. Prolonged bed rest is advised with a local anaesthetic injection into the haematoma to relieve pain.

The same type of injury may rupture a kidney and, if this is suspected, complete bed rest should be ordered with continuous pulse, loin and urine observations. Although a blood infusion may be required to replace blood lost into the loin and urine, nephrectomy is not always necessary. It is advised by many that the best conservative treatment for a kidney injury is operation, but in my experience in the last 5 years it has only twice been necessary to operate for a closed kidney injury, on one occasion to perform a partial nephrectomy and on the other to drain the perinephric haematoma only.

THE UPPER LIMB

THE DISLOCATED SHOULDER

This common injury is not a simple one. The humeral head in dislocating widely tears the capsule, which is relatively avascular and requires months of rest for sound healing. This fact determines the treatment.

Before manipulation, paresis (particularly of the circumflex nerve) must be tested for, and an X-ray film taken. A fracture of the humeral neck will then be known to have been caused by the injury and not by the manipulation. The great majority of the common anterior dislocations, even in nervous patients, can be reduced without an anaesthetic by the Kocher manoeuvre under sedation with the patient sitting and his attention distracted. Successful reduction by this method occurs in the first phase of the manoeuvre, i.e. while the upper arm is still being externally rotated. Whatever method is favoured for reduction, the anatomy of the injury consists of a hole in the capsule, large or small, and although full movements are possible immediately after reduction, their performance predisposes to re-dislocation. The upper arm should be splinted to the chest wall for at least 3 weeks and then abduction only to 90° allowed for a while under supervision.

Rotator cuff injuries of the shoulder, especially the supraspinatus tear, often follow minimal trauma to the upper arm in the degenerative age of man. Despite the age group concerned, if they are diagnosed in time and treated, good results can be hoped for with a painless mobile shoulder; but if they are missed they are likely to end as 'frozen shoulders'. Recently there has been some pleasing improvement in the peri-arthritis and frozen shoulder groups by the local injection of hydrocortone. Hydrocortone can also produce a dramatic cure of a 'tennis' elbow.

A patient is sometimes thought to have a dislocation of the shoulder, yet on examination the humeral head cannot be felt anteriorly, nor is there any apparent abnormality on X-ray. The limb is fixed painfully in abduction and usually cannot be moved. This might continue for some weeks under the diagnosis of 'peri-arthritis' until the original X-ray is reviewed and a posterior dislocation now diagnosed and confirmed by a new X-ray from another position.

Traction injuries of the brachial plexus are common enough to merit mention, and apparently minimal trauma may be the cause in older folk. At this age, cervical intervertebral foramina may be narrowed by osteophytes and the elasticity of soft parts, including nerve trunks, decreased. Despite the poor results of surgical explorations, much can be done by early recognition of the upper limb motor and sensory palsies, by provision of suitable apparatus to relax easily stretched atonic muscles and physiotherapy to keep joints mobile.

STAB WOUNDS OF UPPER LIMB

Without a full clinical examination and possibly exploration, it is not possible to tell how far or deep a stab wound has reached. It is essential to test systematically all motor and sensory functions distal to the wound, otherwise nerve injuries by stabbing are often missed.

A teenager was stabbed in the mid-forearm through the ulnar border and the small wound closed in the Casualty Department without further examination. Three weeks later, a median nerve palsy of the thenar mass was evident with the appropriate loss of hand sensation, and a loss of movement of the flexor pollicus longus. At operation, a fibrous track was found passing very near to the ulnar nerve, not involving it, but with almost complete separation of the thumb flexor from its origin and total division of the median nerve.

THE HAND

Soft Tissue Wounds. All hand wounds are major surgical problems. A small cut on a digit may divide both digital nerve and tendon. Digital movements and sensation must always be fully examined before anaesthesia is induced.

The decision to attempt to repair these structures as a primary measure depends on whether the wound is 'tidy' or 'untidy'.[7]

The tidy wound is the clean incised wound by knife, bottle or other sharp instrument. It is not contaminated and there is no bruising

XUM

or crushing of the skin edges or deeper tissues. It may be quite large.

The untidy wound is one where there has been crushing, with tissues devitalized or infiltrated with blood and which has ragged skin edges. It may be a small wound such as the crushed finger tip.

In the tidy wound, primary suture of divided structures such as digital nerves, flexor tendons in wrist or palm and extensor tendons anywhere, should be attempted and a record made of other structures damaged but not considered for immediate repair—these include the flexor tendons narrowly enclosed within the digital theca and the large nerve trunks. The primary repair is performed with fine, non-absorbable sutures, and in the case of tendons a simple stitch such as the 'basket' suture is satisfactory.

In the untidy wound, all blood clot and dead tissue are removed but skin is spared as much as possible. Using black, non-absorbable suture, which will be found easily at the definitive reconstructive operation later, divided nerve ends are united by a single stitch through the perineurium or the ends at least marked. Those tendons not to be repaired are attached to local tissues by black sutures to prevent retraction. Finally the wound is closed with perfect apposition, avoiding dead space and so reducing scar formation which, if excessive, may make the second operation wellnigh impossible. Even the smallest skin loss must be replaced by immediate grafting, using preferably a free partial thickness (Thiersch) graft. Alternatively, skin pedicled by the injury can be used after its fat has been removed. Except with an extensive, untidy wound where viability of large portions of the hand is in doubt, all emergency hand surgery is best conducted with a bloodless field—only then can the delicate structures be identified and repairs carried out with ease. Fine instruments are essential.

Sliced finger tips, if left to granulate, may leave hard anaesthetic scars. They are best covered by a simple free Wolfe graft taken from the same forearm or, better still, from behind the ear. The use of a pedicled graft from the same palm or adjacent digit is technically difficult and creates a new skin loss.

Traumatic Amputation of Digits.[8] A formal proximal amputation is the easiest method of treatment, but the recipient's occupation must be considered carefully before proceeding, for an extra length of digit may mean all the difference to his retention of his job. Certainly all thumb injuries must be treated as conservatively as possible and all tissue spared, as the loss of any part of the thumb is serious. Unlike the lower limb, there is no adequate prosthesis for it.

Conservation in fact, is the key-note of all emergency hand surgery and, most of all, skin cover must be attained.

The Mallet Finger. Excluding those which are open injuries and caused by section of the extensor expansion over the terminal interphalangeal joint, this common injury is due to forced flexion of the actively extending finger tip. A similar injury can occur more proximally in the digit to give rupture of the central slip of the expansion over the base of the middle phalanx (Fig. 3). The mechanism of injury is common to all parts of the body where there are muscles and tendons of length acting over fulcra. Other common examples occur in relation to the 'open' side of a joint-rupture of the extensor apparatus of the knee joint (or the patella fractures), rupture of triceps (or the olecranon fractures), rupture of the tendo Achillis. None of these ruptures is transverse as is usually depicted in textbooks. They are ragged disruptions in length, as one sees in a rope which has parted under violent strain.

With the exception of excessive strains, such as occur when a fast bowler sustains a rupture of the tendo Achillis, these injuries occur predominantly in the age of degeneration.

Bowls is reputed to be an old man's game. A gentleman on his retirement took it up and in his first game had a rupture of the biceps brachialis—the weight of the bowl surprising him and his biceps when it was actively contracting. The same type of injury can, of course, occur in a younger age group.

The outcome of the treatment of mallet finger is often unsatisfactory. The classical plaster of Paris splint with the proximal interphalangean joint flexed and the distal interphalangeal joint hyper-extended, seldom restores extension to the distal joint. Late open repair is difficult, for the expansion is normally adherent to the distal joint capsule and it is not easy to gauge how much scar should be excised. Exploration is merited, however, for avulsion-fracture of the terminal phalanx base if it is still displaced after application of the classical splint.

Fortunately the mallet finger is often of little disability, requiring no treatment.

Fractures of Digits. Some points concerning treatment deserve mention.

XUM

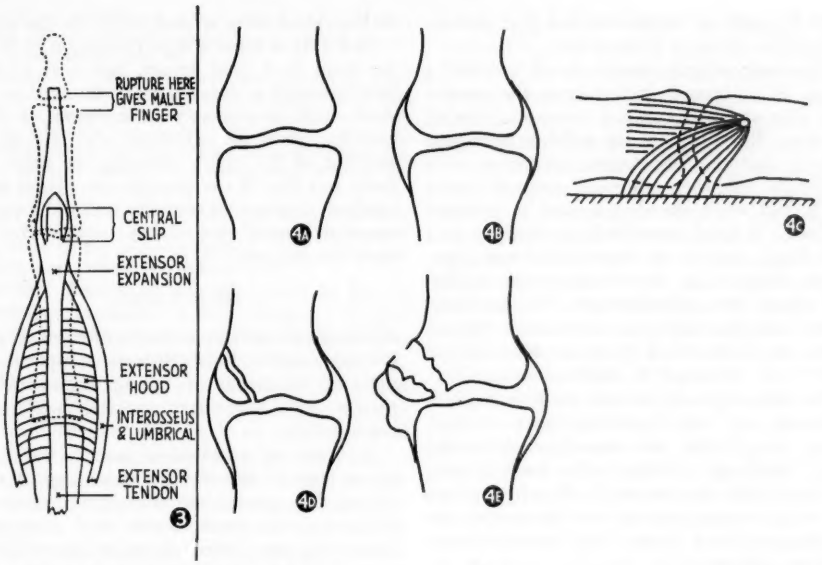


Fig. 3. The extensor complex of a digit.
Solid line: Extensor apparatus.
Interrupted line: Phalanges of digit.

Fig. 4. A chip fracture of the phalangeal base.
A: Digital joint as seen on X-ray. A-P view.
B: Digital joint as it should be visualized. Alar ligaments and capsule shown.
C: Lateral view of the interphalangeal joint to show the attachments of the alar (collateral) ligament to the phalanges and the flexor sheath.
D: A chip fracture in satisfactory position with probably no rupture of the alar ligament. Open repair not required.
E: A chip fracture with rupture of the alar ligament and the capsule and marked displacement. Arthritis is probable. Operative replacement is indicated.

A secure well padded dressing is often the best splint.

When a fracture is immobilized, flexion is more important than extension for maintenance of hand function.

Arthritis following a tiny chip fracture of a phalanx into a joint may prove very troublesome. The disability may be prevented by a simple operative repair of the capsule and/or alar ligaments if wide displacement of the chip indicates such soft tissue injury (Fig. 4).

Dislocation of an interphalangeal joint usually has the proximal bone displaced in a volar direction. The capsule, flexor sheath and often the alar ligaments are grossly torn. If the dislocation cannot be reduced by a closed manipulation, then the head of the more proximal phalanx may have been buttonholed through the flexor sheath and an open reduction be required.

An open fracture of the terminal phalanx with a crushed finger end requires a full toilet to remove all blood clot and accurate apposition of tissues to eliminate dead space and so avoid infection. The nail is a good splint and should be retained.

THE HEAD

SCALP WOUNDS

These injuries are frequently given scant attention. They often occur in drunken patients who are bothersome on busy nights, but that does not excuse a cursory examination and rapid, untidy suturing. Septic conditions such as cellulitis of the scalp, which usually indicates extensive necrosis of the galea or osteitis, are the result of slack toilet, failure to excise bruised and dead skin edges and galea, and failure to reduce haematoma to a minimum. These complications are difficult and dangerous conditions to treat. There is the same need for immediate suture in scalp wounds as elsewhere and an antibiotic

XUM

cover by itself is insufficient and does not remove dead tissue or haematoma.

The scalp is first shaved of all hair for a radius of at least 2 inches from the nearest skin edge and hair retained is strapped out of the way. If the wounds are multiple the whole scalp is shaved. The wound is washed with Cetrimide 1%, then ether and covered with a sterile pad while the skin around is similarly washed. A local anaesthetic is injected as a field block around the wound, but not introduced from inside the wound itself, as this will spread the contamination. The operator, patient and assistants are all masked. Sterile gloves are worn and if these are not available a no-touch technique is followed.

The skin edges are excised for ⅛ inch width including any extra portions very bruised. Using skin hooks for retraction of wound edges, blood clot, foreign bodies such as hair, and dead galea are removed. Bleeding points are caught temporarily in fine haemostats but are best occluded by the final wound closure without ligation.

To facilitate the search for a fracture, the wound is extended if necessary. For those parts not visible, the wound is palpated with a gloved finger, which is the most efficient and safest probe to use. A metal probe used blindly is dangerous for it may:

1. Penetrate intact dura;
2. Disturb blood clot deep to the skull and start torrential haemorrhage;
3. Injure the brain;
4. Introduce infection into the meninges and the brain.

Finally the wound is closed in 2 layers so that haemostasis is perfect and all dead spaces are obliterated. Fine size 2/0 or size 3/0 non-absorbable sutures are inserted throughout, first to appose the galea and then the skin edges, being placed ⅛ inch from the edges and ¼ inch apart. The galeal suture in itself will be seen to be so satisfactory that the skin edges will lie snugly together and skin sutures can be removed with safety within 2 days.

Scalp wounds more than 3 inches long should be admitted for formal exploration, excision and suture in a fully equipped theatre. The report of the loss of much blood from a small scalp wound is not to be ignored. In addition to the blood seen in the hair and on the patient's clothes, a lot more has probably been lost at the scene of the accident and the patient may well require a blood infusion. Surgical shock is not a feature of head injuries and, if it is present, other injuries must be looked for, or the blood loss from an associated scalp wound might be the cause.

Not only is there a legal obligation to X-ray the skull in a head injury, but it is evident that although a non-depressed fracture of the skull itself is relatively unimportant, a fracture line gives an indication not only of the violence of the injury affecting the brain beneath but also of the possible site of the main cerebral damage. Certainly a skull X-ray is essential for any case of head injury who has been unconscious.

CONCUSSION

Although the greater majority of cases of concussion recover fully without complications, there is no means of telling at first which patient will later have a fatal intracranial haemorrhage.

All cases of concussion must be admitted for at least 24 hours' observation and, if they refuse this, precautions should be taken by informing the home doctor and a relative, instructing the latter of premonitory symptoms, especially headache and drowsiness. A mother must be warned to distinguish between her child's need for natural sleep and a lowered conscious state due to injury.

In the ward, the basic clinical observation made is the assessment of the level of consciousness, which is graded according to the patient's response to suitable stimuli, vocal, visual and painful and recorded every 2-3 hours, preferably in graphic form. At any time a new observer can thus take over the case, knowing at once its progress. In the description of the level, the observer avoids such terms as coma, semi-coma, stupor, etc. which have no distinct meaning and give no indication of a slight change in the level of consciousness.

A simple, precise scheme for grading of the conscious state is as follows:

Level 0: The normal level of consciousness as is generally understood and characterized by quick, intelligent responses to all types of stimuli and a complete awareness of the environment.

Level 1: The patient has apparently recovered after being 'knocked out' and exhibits appropriate responses with control of mental faculties. He gives coherent replies and answers all questions reasonably well and will volunteer information, yet shows mild confusion.

Level 2: The patient responds purposefully though slowly to all manner of stimuli, but requires to have these stimuli repeated and may not respond to all. He does not volunteer information.

Level 3: A more clouded state when the patient will still answer questions which, however, have to be firmly put and might have to be reinforced by some act (e.g. 'Take my hand', the observer holding out his hand). The responses are usually single

words or simple replies to instructions. At this level the patient will respond to all painful stimuli in a purposeful way.

Level 4: The patient does not respond to vocal stimuli but shows a purposeful response to painful stimuli, e.g. he may try to remove the examining hand with his own hand. He is now deeper in unconsciousness, so his bladder empties reflexly, but the primtive corneal and swallowing reflexes are still present.

Level 5: This is the lowest level of consciousness and the patient is likely to die. There is no response whatever to any stimulus applied. The corneal and swallowing reflexes are absent.

Other findings at any level such as loss of memory, headache, pulse changes, unequal pupils, bleeding from an orifice, play no part in the assessment of the conscious level.

The night hours are the most dangerous and the doctor must carefully decide whether he can delegate the watch of the patient to a nurse, or must himself stay by the bedside. The nurse must, on every visit to the patient, rouse him sufficiently to demonstrate that the conscious level has not in fact deteriorated and that the patient has been naturally asleep. It is not enough to shine a torch into the sleeping patient's eyes and look at his pupils; he must be fully roused. The greatest care is taken of the inebriated, in whom it may be impossible to assess whether the disturbed consciousness is due to alcohol or to a space-occupying lesion.

Space does not allow a review of the most important elementary nursing principles involved in the care of head injuries where, perhaps more than in any other surgical sphere, the nurse can really come into her own.

In what is thought to be a minor case of head injury, continuous headache may indicate trouble. Before the pulse and pupils change, the patient with an extradural haemorrhage will often complain of increasing and often unbearable headache, usually on the side of the bleeding. The classical slow pulse and fixed dilated pupil describing the 'change for the worse' and the need for operation are signs of advanced intracranial displacement and to wait for them may mean that the chance of success in an eminently operable condition is missed. Since the deterioration of a patient with an extradural haemorrhage can occur with alarming rapidity, observations of all concussed patients should be at frequent intervals, preferably not longer than 15 minutes.

FACIAL INJURIES

Open Wounds. The skin and soft tissues of the face and neck have such an excellent blood supply that despite the frequent bruising and tearing injuries seen, much tissue can be left that elsewhere in the body would be removed for safety. As much skin as possible should be kept to retain symmetry of facial expression. Gas grangrene is unknown here. The finest non-absorbable material should be used to appose the wound edges, placing the sutures as close together and as near the skin edges as possible. It is advisable to encourage ventilation, and use no dressing if possible—any wound with skin edges perfectly apposed is sealed off about 12 hours after suture from infection from without.

To reduce scarring to a minimum, sutures are removed within 72 hours.

The Broken Nose. This is usually a fracture-dislocation of nasal plate elements, open into the nose and often floating in a large sea of blood. The need for reduction is based entirely on cosmetic requirements and the restoration of a satisfactory air entry.

If there is much swelling, it is inadvisable to attempt reduction immediately, which is easy enough to do, but often impossible to maintain. A delay for 4-6 days is then an advantage. If a splint is used, it is best applied from within by nasal packing, which should be removed within 48 hours.

The Malar Fracture. This is caused by direct violence on the cheek and because of the frequent extensive bruising, is often missed, only to be diagnosed too late for easy reduction when the fragment is fixed securely in fibrous tissue.

The fracture should be suspected in all cases of bruising of the outer cheek and lower eyelid. When it is part of a diffuse injury it is often not possible to detect any bone deformity clinically until the swelling has subsided. It is likely, however, if there is congestion of the lower conjunctival fornix, and if there is tenderness localized on the line of fracture through the orbital foramen area and zygomatic arch and where the fronto-zygomatic suture is dislocated.

Reduction should be considered if one or more of the following features are found:

1. An unsightly depression of the zygmatic arch or flattening of the cheek; of obvious importance to a woman but not perhaps to all men.
2. Diplopia due to alterations of extra-occular muscle attachments in relation to the eye.
3. Reduction of the open mouth arc by jamming of the coronoid process of the mandible on the rotated malar fragment or in the pterygoid muscle mass.
4. Infra-orbital anaesthesia which is common and not always permanent since it is often due to bruising of the nerve in its broken canal.

XUM

The Fractured Mandible. This fracture is often open into the mouth and prone to infection, leading to protracted osteitis if not diagnosed.

Any case with pain in the lower jaw after a blow, especially if there is an external swelling and inability to open the mouth, should be X-rayed. The fundamental aims in the treatment are the restoration or maintenance of the normal dental occlusion, and the prevention of infection. A bandage splint, with its design adapted from a barrel hoist, is satisfactory enough to immobilize those without displacement, if it is frequently inspected and adjusted; and for all cases as a temporary measure. It can be made of rubber. For most fractures with displacement, fixation can be achieved by interdental wiring.

Carious teeth on the edge of a fracture should be removed.

FOREIGN BODIES

The smaller these are, the more difficult they are to remove. An operation for those deep in the palm may cause more harm than the foreign body would ever do itself. Metallic bodies travelling at speed engender great heat and are usually sterile in themselves, but of course may carry in with them portions of contaminated clothing. Relatively small ones such as needles, deep in large muscle masses as in the thigh or buttock, should be left unless infection is associated.

At least 3 X-rays should be taken at different angles with a skin marker in place and as near to the time of the operation as possible.

A bloodless field should be used wherever possible. With linear foreign bodies, a good method of exploration is to incise at right angles to the line of the foreign body and in all cases to use the track or scar as a guide. If the search is prolonged and damage to important structures likely, the operation should preferably be abandoned. It is often better to wait until morning before searching for a foreign body than doing so late at night under trying conditions.

SUMMARY

1. Some common injuries, so called 'minor ones, have been reviewed to demonstrate how dangerous they may be despite their initial benign appearance.

2. Three major groups have been considered—certain 'minor' injuries which may have major complications, others which are indifferently treated and another group of major injuries caused by apparently minor trauma.

3. The fundamental principles of care for all injuries have been described, stressing the need for asepsis in the open wound and the control of swelling in the closed one.

4. It has been indicated that it is only from a constant awareness and a complete examination of the lesion both clinically and at operation, that complications will be reduced.

5. It is suggested that in regard to trauma, a re-orientation in the training of doctors is necessary to make them always aware of the whole injury. The soft tissue damage is as much the essence of the total injury as is the bone damage and frequently supersedes the latter in importance. Laying too much stress on the fracture makes for a tardy diagnosis of other parts of the injury. The sequelae are no less unfortunate than leaving bones malunited and may lead to permanent disability.

OPSOMMING

1. 'n Aantal gewone beserings, die sogenaamde ‚geringer' beserings, word in oënskou geneem om aan te toon hoe gevaarlik hulle kan wees, ondanks die feit dat hulle aanvanklik geen kwaadaardige indruk gemaak het nie.

2. Drie belangrike groepe word in oorweging geneem—sekere ‚geringe' beserings wat ernstige verwikkelinge kan hê; ander wat op 'n agterlosige manier behandel word; en 'n derde groep belangrike beserings wat deur oënskynlik geringe letsels veroorsaak is.

3. Die fundamentele beginsels ten opsigte van die versorging van alle beserings word beskryf, en die noodsaaklikheid van asepse in the geval van die oop wond, en die uitoefening van beheer oor die swelsel in die geval van 'n geslote wond word beklemtoon.

4. Daar word gekonstateer dat komplikasies alleen verminder kan word deur 'n gedurige bewustheid en 'n noukeurige ondersoek van die letsel, sowel klinies as tydens 'n operasie.

5. Wat wonde betref, word daar aan die hand gedoen dat 'n nuwe oriëntering in die opleiding van dokters nodig is om hulle gedurig bewus te hou van die hele besering. Die beskadiging van die sagte weefsels is net so 'n belangrike onderdeel van die hele besering as die beskadiging van die been. Trouens, eersgenoemde is dikwels van groter belang as laasgenoemde. As te veel aandag aan die beenbreuk bestee word, sal dit waarskynlik 'n trae diagnose van die ander dele van die besering tot gevolg hê. Die resultaat kan net so ernstig wees as wanneer 'n gebreekte been verkeerd aangroei en kan aanleiding tot permanente ongeskiktheid gee.

REFERENCES

1. Laurent, L. J. M. and Parrish, H. J. (1952): Brit. Med. J., **1**, 1294.
2. Moynihan, N. H. (1956): Brit. Med. J., **1**, 260.

XUM

3. Gissane, W. (1955): Practitioner, **175**, 450.
4. Grant, R. T. and Reeve, E. B. (1951): Spec. Rep. Ser. Med. Res. Council (London), 277.
5. Ruscoe Clarke (1952): Arris & Gale Lecture of the Royal College of Surgeons of England.
6. Rook, J. R. (1951): Anaesthesia, **6**, 221.
7. Rank, B. K. and Wakefield, A. R. (1953): *Surgery of Repair as Applied to Hand Injuries.* Edinburgh: E. & S. Livingstone Ltd.
8. Evans, E. M. (1949): Brit. J. Plast. Surg., **2**, 159.
9. Editorial (1957): This Journal, **3**, 89.

PAVLOV'S CONTRIBUTION TO PSYCHOLOGICAL MEDICINE

K. R. L. HALL, M.A., D.PHIL. (OXON.)
Department of Psychology, University of Cape Town, Cape Town

Pavlov was once described by a distinguished American exponent of his doctrine as 'the psychiatrist of the future'. So great was his reputation as a medical scientist that the attempts he made, towards the end of his long career, to extend his scientific doctrine to clinical psychiatry were, in some quarters, accepted uncritically as a revolutionary advance as significant in its own way as his discovery of the laws of conditioning. The significance of Pavlov's work in this field has recently received a wide public exposition in Sargant's book *Battle for the Mind*,[12] where dramatic parallels are drawn between political and religious conversion techniques and changes induced in neurotic patients through physiological and conditioning therapy. Critical appreciation of the general implications of Pavlov's work in relation to psychological medicine has, however, been lacking, and it is the purpose of this article to estimate its significance on the assumption that his later ideas are much less familiar to the medical profession than the Freudian psycho-analytic doctrine dealing with similar problems of neurosis, psychosis and psychosomatic illness.

In attempting such an appreciation, I assume that any system of principles that is to be valid in explaining the whole range of behaviour variations encountered in medical practice, from mild anxieties to the profound disintegration of psychosis, must be derived from the detailed scientific investigation of the interaction between so-called 'psychological' and so-called 'physiological' processes. Otherwise stated, I assume that the systematic basis for psychological medicine must be a 'physiological psychology'. Such an assumption is not, in fact, quite so opposed to Freudian doctrine as might at first appear. Although, indeed, the 'dynamic', clinically-derived doctrine of Freud is usually seen as antithetical to the 'mechanistic', physiologically oriented doctrine of Pavlov, it is worth recalling that Freud himself, according to Jones,[6] had certainly envisaged the probability that his own system would eventually be translated into terms and principles directly relating to neurophysiology. In fact, Freud has been credited by Jones with at one time expounding a neurophysiological conception of mind that lacked nothing in comparison with the recent 'models' of the cyberneticists. Pavlov's scientific progression was, of course, antithetical to Freud's, in that he started from the objective physiological study of the behaviour of relatively simple organisms, and then made his extensions to Man's higher nervous activity and its disorders; but the final account of behaviour disorders will undoubtedly synthesize much from both approaches.

HIGHER NERVOUS ACTIVITY AND PATHOPHYSIOLOGY

Before trying to assess Pavlov's contribution, it will be necessary to restate, in summary form, the main scheme of the work. Its basic assumption is that the higher nervous activity of Man must be a synthesis of physiological units (conditioned reflexes) arranged in a kind of hierarchy, far more extensive than that of the lower animals yet fundamentally alike in the principles of its functioning. If this may seem a formidable supposition for any set of principles derived chiefly from experiments on dogs, it must be noted that Pavlov,[10] in his earlier lectures, was fully aware of the enormity of the extension he was proposing, although at the same time scientifically dedicated to its thorough testing on human behaviour. Only later, perhaps for political reasons, after Pavlov's death, do we find his system turned into a dogma admitting apparently of no correction from Western 'idealist' physiology, such as Sherrington's, or from the comparative and physiological psychology of the Americans.

As early as 1903, according to Frolov,[3] Pavlov had proclaimed his intention of creating a pathophysiology or psychopathology (which

terms, for our present purpose, we can take as synonymous) founded upon animal experimentation. Between 1921 and 1923, the first studies of the experimental neuroses in dogs were undertaken in the Leningrad laboratories. One can classify the stress situations inducing 'neurotic' behaviour in animals in various ways, but it will suffice to summarize the situations as being too difficult for the animal, as involving it in unpleasant confinement from which it could not escape, or as involving some physical deprivation designed to weaken the resistance of the nervous system to external stress. The phases of progressive inhibition through which the animal's nervous system would pass, when exposed to such stress, were clearly described, the experiments lacking nothing in scientific rigour. The central therapeutic concept derived from this work was that of 'protective inhibition'. Broadly but oversimply explained, this implies an automatic adjustment device of the nervous system that prevents it from further damage, and creates the possibility of recuperation. Normal behaviour might be restored fairly quickly in some animals by their removal from the stress situation and its surroundings, but physiological recovery might be accelerated by facilitating the protective inhibition through rest and sedation.

The findings from these experiments came thus to be used as analogies to aid in the mechanistic description and treatment of the human neuroses; and it is here that we should stop to consider their aptness or their limitations. Our doubts may be framed in such questions as the following:

(1) Clinical experience of human neuroses indicates that they may be multiply determined through the interaction of constitutional and cumulative environmental factors. Can these simple analogies comprehend such complex interaction?

(2) Related to this, Man lives in a complex society, and has a vast system of language communication and symbolic rewards and punishments to enable him so to live. Is it therefore scientifically possible to bridge so simply the gap between canine and human neurotic behaviour by, as it were, increasing the number of spans without altering the principle of their construction?

Other limitations have been suggested, but it is now necessary to trace how Pavlov attempted to deal with these two that I have stated. After the experimental foundations had, to his satisfaction, been laid, Pavlov turned his attention, in the latter years of his life (when he was, in fact, 80) to the task of applying his results to clinical psychiatry. His second volume of lectures[11] and the accounts given by Frolov[3] and others, show how he tried to make this application in the form of two systematic developments of his principles, in order to account for:

i. Typical individual variations; and
ii. The language behaviour of Man.

1. TYPES OF NERVOUS SYSTEM

The story of the behaviour of Pavlov's dogs in the Leningrad floods of 1924 is a kind of much-repeated scientific classic that need only be given in bare outline. These laboratory dogs were almost drowned by the rising flood waters, but were rescued just in time. The dogs showed very different degrees and kinds of reaction to this stress. Some persisted in 'neurotic' behaviour and loss of function of previously acquired conditioned reflexes much longer than others, some showed apathy, others wild excitability, and so on. Clearly, then, the causes of individual variation in response to identical stress must be explained and, while he was careful not to exclude causes arising from different early conditioning, Pavlov came to the conclusion that certain 'typical' variations could be attributed chiefly to 'typical' properties of individual nervous systems for which there might be some inherited basis.

As a result of many years of observation of varying reactions of dogs in stress situations, he completed this part of his system by classifying the dogs into 4 main types varying in strength and weakness of nervous system and in quality of neurotic behaviour. It was to the 4 Hippocratic types of human temperament that he assigned the dogs on this basis. Thus, the choleric type corresponds to 'strong excitatory' nervous system, sanguine to 'lively balanced', phlegmatic to 'calm imperturbable', and melancholic to 'weak inhibitory'. Assuming, therefore, that temperamental or nervous system type is inherited, the behaviour under stress of an individual animal is the resultant of interaction between basic type or tendency and the variety of specific conditioning influences to which the animal has been submitted during its life.

The use of such a simple scheme of classification is open to many objections. It may be supposed, for example, that even in applying it to dogs, the types emerge distinctively in Pavlov's animals because the conditioning influences to which they had been exposed were more standardized and uniform than those to which the 'average' dog would be submitted. In applying the classification to Man, the fact that the environmental influences

would be far more extensive, varied and prolonged, may well be expected to obscure whatever underlying temperamental variations may exist. Thus, because of the very complexity of his cortical apparatus, Man may be able to modify his temperamental characteristics far more thoroughly than can an animal at a lower level of development. Although it is probable that Pavlov was perfectly well aware of these limitations, it was necessary for the completeness of his system to attempt some such account of individual variation.

Nevertheless, such a scheme, however inadequate, has at least the advantage of emphasizing that certain basic emotional characteristics may determine, not *how much* learning takes place in an individual's life, but the *kind* of learning to which he preferentially exposes his nervous system. Thus, although basic temperamental type may, in normal Man, be heavily obscured by the thoroughness of social conditioning, when his adaptive behaviour is disrupted through stress, he may reveal neurotic characteristics that enable him to be much more distinctively classified. It is, in fact, obvious from Pavlov's own researches as well as from clinical observation, that the first to disintegrate under stress are the most recently acquired conditioned responses, thus laying bare the more fundamental or 'primitive' emotional responses that at least partially derive their characteristics from inheritance rather than training.

2. LANGUAGE BEHAVIOUR

In order to account, consistently with his principles of conditioning, for Man's language behaviour, Pavlov supposed the existence of a second signal system, or system of 'signals of signals', which is peculiar to Man while at the same time functioning physiologically in the same way as the first signal system possessed by all animals. This first system is simply the sensory input from distance, cutaneous, chemical and internal receptors, organized cortically, in so far as conditioning is concerned, into 'analysers'. As is seen from the classical salivation experiments, the Pavlov type of conditioning essentially enables the organism to extend the range of the signals to which it can usefully make a particular innate response. The second system is not very precisely defined, nor has it apparently received systematic experimental attention, but it was hailed by some of Pavlov's compatriots, though not elsewhere, as his most daring and brilliant 'discovery'. The signals of this system are, rather vaguely, the kinaesthetic stimuli from the speech organs which come to be associated with concepts or categories derived from the first (sensory) signals. This system is said to be primarily the concern of the frontal areas of the cerebral cortex.

The link in Pavlov's system between his idea of the second signal system and the problem of individual variations in behaviour disorganization is provided in his second volume of lectures already referred to,[11] in which conditioning principles are applied to clinical psychiatry. The hysteric is thus described as a patient relatively weak in the second signal system, so that, presumably, symbolic elaboration and control of the first, and the subcortical, system is deficient. Thus, when breakdown under stress occurs, it may receive its chief behavioural expression in motor and other somatic symptoms. In the obsessional, on the other hand, the second signal system may be highly developed and maintains a rigid, but costly, control over the other two systems. Normal variations are seen in the artistic as opposed to the intellectual type.

Pavlov goes further, not only in elaborating these nervous system types with reference to the neuroses, but in attempting to use this kind of hierarchical model of the relation of three signal systems for the understanding of psychotic states, such as paranoia. In addition, he describes the schizophrenic state in terms of an extreme manifestation of protective inhibition which becomes so extensive that it alters or reduces the function, not only of fairly recently acquired conditioned reflexes, but of long-established habits and even of some unconditioned responses. The brain function analogy is to the state of inhibition occurring in sleep or deep hypnosis. One might describe the stuporose condition of severe depression in the same terms, but presumably the symptomatic differences in the inhibitory state of the schizophrenic and of the depressed patient would be due to inherent differences in basic temperamental type.

DEVELOPMENTS AND LIMITATIONS

1. DEVELOPMENTS

Although this has necessarily been a very brief summary of the later Pavlov doctrine and programme of research, it may suffice as a basis from which to survey certain other developments along these lines, as well as the limitations and potentialities of this approach as a

XUM

system applying to the problems of psychological medicine.

Clearly, the work on experimental neurosis provided the inspiration for a vast amount of much-needed scientific research of a similar kind on the formation of abnormal, non-adaptive behaviour patterns in animals. Through the researches, in the U.S.A., of Gantt, Massermann, Maier and many others too numerous to mention, it has become possible to describe objectively a wide variety of reactions to frustration and conflict occurring in laboratory animals, so that the analogies available for application to human clinical conditions brought about by environmental stress have been considerably extended. But by no means all these investigators are committed uncritically to the Pavlov doctrine. Rather have they taken over his basic methods, extending the range of experimental variation, technique and responses to be conditioned, without necessarily adhering to orthodox Pavlovian interpretation of their results. In the U.S.S.R. it is difficult to know the extent of the post-Pavlov developments in this kind of research, but one very striking example, relevant to the study of psychosomatic illness, is the work of Airapetyantz and Bykov[1] on interoceptive conditioning in dogs. In their experiments they appear to have clearly demonstrated that responses arising from the visceral organs can be conditioned to 'neutral' stimuli in precisely the same way as salivary or skeletal motor responses. They reasonably infer that information from the internal organs can be differentially elaborated at a high level of the nervous system and used, in association with external stimuli, as a basis for the animal's physiological adjustment to its environment. They believe they have demonstrated objectively the mechanism whereby so-called 'subconscious' information may influence, and be influenced by, the cortical analysers of external signals.

It has, of course, been an essential further stage in development to test the Pavlov conditioning principles directly upon human subjects and patients. The main body of this application has been recently reviewed by the present writer,[4] and the various investigators have been able to demonstrate deviations from the normal in the conditionability, extinction rate and powers of stimulus generalization and discrimination shown typically in anxiety states, psychotic conditions and various forms of organic brain disease. According to Ivanov-Smolensky,[5] a vast programme of experimental research of this kind has, since Pavlov's death, been undertaken in the Soviet Union, and he makes claims of outstanding advances in the objective physiological investigation of schizophrenia and depressive states, as well as of the mechanisms whereby environmental stress may increase the individual's susceptibility to certain forms of 'physical' illness. It is naturally impossible to estimate the validity of these claims merely from the synoptic accounts of the researches given by Ivanov-Smolensky, but the logical scientific goal of the whole of the Pavlovian approach to medicine is interestingly apparent in these essays. This goal is the bringing together, into one comprehensive system of experimental medicine based upon the Pavlov physiological principles, of all those disorders that we loosely, but conveniently, class as psychogenic, physiogenic or psychosomatic. Although this goal may be medically and scientifically desirable, the limitations of the Pavlov approach in setting out to achieve it will be apparent in my later discussion.

As already stated, the analogies now available from animal experiments carried out along the lines pioneered by Pavlov have been increased, and some clinicians believe that their chief value for psychopathology is provided by the insight they can give in explaining the mechanisms whereby environmental stress may induce reactive depression or neurotic symptoms in Man, or in accounting for various aspects of psychotic behaviour in terms of the paradoxical and ultra-paradoxical phases of cortical inhibition. Implicit in this is the understanding that experimental research on human subjects can never reproduce in severity or in length of time conditions that would be required to produce neurotic breakdown. The foregoing research on neurotic or psychotic patients has as its main task the objective description of symptoms and underlying mechanisms as they now appear in the end-result of the abnormal clinical condition.

2. LIMITATIONS

While it is clear that the record of experimental research and mechanistic analogy derived from Pavlov's work has contributed greatly to the scientific foundations of psychological medicine, it must be appreciated that this is largely due to the excellence of his methods and not to the soundness of his theory or its simple extrapolation to the higher nervous activity of Man and his disorders. I propose to discuss briefly three major limitations of the doctrine.

XUM

i. Pavlov and his adherents have claimed that all the modifications and elaborations of behaviour due to learning can be described in terms of the basic classical conditioning process or unit of the conditioned reflex. Obviously any set of principles of behaviour, to be broadly applicable to the variety of problems covered by psychological medicine, must be able to account not only for the minor deviations such as mild anxieties or exaggerated reaction to pain but also for the major catastrophes of psychosis, chronic neurosis and reactions to brain injury or operation. Whereas there is no doubt that his conditioning model applies well enough to conditioning at the *physiological* level, the response-system involved being that of the smooth muscles and glands, it is generally considered to-day that this model is not adequate to explain what we can class as the 'problem-solving' behaviour of Man or of the higher animals. The Pavlov type of conditioning is essentially a *passive* form of learning, because it simply involves the process of increasing the range of stimuli by which a particular response is serviceably initiated, but it does *not* account for the *active* forms of learning where the motor response system (including that of speech) is organized into skills of various kinds. Of the several writers who have considered it necessary to distinguish between at least two forms of learning rather than the one of Pavlov's system, Konorski's views[8] are perhaps the most directly relevant. He distinguished between a Type I conditioning (Pavlov's) and a Type II conditioning where active response-learning rather than passive stimulus-learning is the essence. The former may usefully account for much, if not all, of the basic habit formation of the young child whereby its emotional behaviour patterns are acquired. It is, of course, widely, if not universally, agreed by clinicians such as Freud and Adler as well as by behaviourists such as Watson, that the emotional conditioning of the first few years of the child's life is of utmost significance for later adjustment or maladjustment. Pavlov's conditioning model thus provides the basic mechanism for one of these early forms of learning, as well as for the passive emotional conditioning that may occur at any time in a person's life when he is attempting to adjust, at a physiological response level, to the stresses of his environment. It obviously cannot, however, comprehend the environmental circumstances that may lead to the formation of stable or unstable conditioned emotional responses in a particular case. It simply provides the general explanatory framework into which the clinician may fit his observations.

The clinical limitation of any such mechanistic analogies provided by conditioning principles and their laboratory application in experimental neurosis is that they may be relevant only to a limited class of human disorder, such as that caused by the specific stresses of war or crisis, and cannot account for the early social and family factors which may lead to the establishment of a persistent neurotic state. The Pavlov system may provide a general plan, a kind of wiring diagram, useful for tracing faults and rectifying them when they have occurred, but not for *preventing* such faults from occurring. This is an aetiological limitation, but the conditioning therapist may not unreasonably maintain that his primary objective is the understanding of the patient *as he now is*, so that he can attempt, perhaps with the aid of physiological treatment, to recondition the patient's responses to fit him to his present environment, and without regard to supposed traumata in the early years. In this respect, conditioning principles may be more relevant for the therapeutic task of the general practitioner than are the principles derived from psycho-analysis.

At the same time, the general limitation of classical conditioning to the passive forms of stimulus-learning is a serious one. While it is clear that the social or occupational skills of the individual may be very dependent upon the stability or otherwise of his conditioned emotional responses, it is largely through his active problem-solving learning that he is able to maintain his social adjustment. In other words, intelligent and realistic trial-and-error and insight-learning may lead to active solution of emotional difficulties and to modifications of earlier faulty conditioning of the Pavlov type. There is no other way of explaining the success of some individuals in overcoming profound disturbances in early childhood, and in learning to avoid social situations that would be emotionally disruptive for them. Much of the social skill attained in this respect by the individual is intimately related to his powers of verbal communication, and it does not seem that the Pavlov 'second signal system' can provide an adequate model for the acquisition and use of complex symbolic response categories of this order. Nor, therefore, is the model valid for the description and explanation of the abnormalities in communication occurring in schizophrenia or paranoid states.

XUM

We may thus conclude that the Pavlov doctrine is directly valid in explaining a 'primitive' emotional habit formation, but is inherently limited to mechanistic description and therefore must disregard the nature of possible causal factors in human breakdown other than immediate and obvious environmental stresses. The higher forms of active intelligent adjustment by the individual which may enable him to work out a successful compromise between his conditioned emotional responses and his social environment are not satisfactorily explained in terms of classical conditioning and the second signal system extension. The human being, in his social habitat, is not simply a stationary conditioning machine, but is, or can be, an active, highly mobile agent who looks for, and tries to create for himself, a suitable environment.

ii. The second limitation concerns the validity of Pavlov's nervous system typology. A satisfactory account of individual variation must, as Pavlov saw, be one of the foundations of a scientific psychopathology. In recent years, Eysenck[2] and his associates at the Institute of Psychiatry, London, have tried very hard to establish the main dimensions of temperamental variation, normal and abnormal. The main dimension so far statistically established is the Kretschmerian one of cyclothymia–schizothymia, and its Jungian counterpart of extraversion–introversion. The pathological variants of this are the neurotic dimension of hysteria–dysthymia, and the psychotic dimension of manic depression–schizophrenia. The fundamental purpose of this work is to provide a simple scheme of classification for all varieties of psychosis and neurosis in terms of their predisposing inherited temperamental origin. Unlike Pavlov's, this scheme is based on the statistical principle of continuous variation, but the grouping of disorders is very similar.

The direct link between the Pavlov scheme, and Eysenck's, has come from the recent conditioning studies in the latter's laboratories designed to provide objective evidence on the variation between typical hysterics and typical neurotics of the dysthymic group (i.e. anxiety and obsessional cases). Pavlov's assumptions of 'weak' or 'strong' nervous systems had no real experimental support or physiological meaning, but the attempt is now being made, apparently with some success, to define the nature of the variations in terms of performance on conditioning tasks. The limitation of Pavlov's typology, in extension to human variation, was that it was based on observations of the reaction types of dogs and had not been tested objectively on human neuroses. If, therefore, his assumptions can be verified and made precise by experimental investigation, an important advance will have been made in demonstrating how basic temperamental variation may be reflected in habit formation. But, in order to complete the account, it is essential to carry the investigations beyond the classical conditioning procedures, and to use Type II learning tasks (including language studies) to determine how, if at all, temperamental variation is reflected in complex problem-solving behaviour.

We now require to ask how far his nervous system types have been followed up in the study of the psychoses. Here it seems that the Pavlov ideas of relative strengths and weaknesses of the three signal systems in these conditions have received little, if any, substantiation. As stated, the Pavlov techniques have been applied experimentally in some studies of schizophrenia, of the affective disorders and organic psychoses. It seems clear, however, that any attempt to type the psychoses at present is worthless and, indeed, confusing, because far too little basic experimental research has been done even at the classical conditioning level, while the higher levels of language and problem-solving behaviour have been no better served.

iii. The third major limitation to the Pavlov doctrine arises when we come to consider in what general respects it falls short of the kind of physiological psychology required as a basis to psychological medicine. It has often been pointed out[9] that Pavlov's explanations of his experimental data have not been consistent with modern neurophysiology. Konorski,[7] in fact, reinterpreted and reorganized the whole of the vast experimental material of the Pavlov school, and applied Sherrington's conception of the integrative action of the nervous system to account for the higher nervous activity. Thus, the 'synthetic' account of this activity in terms of conditioned reflex units of higher or lower orders is replaced by one more consistent with established neurophysiological principles. As it seems essential that the principles of human behaviour basic to psychological medicine must be developed with the closest possible reference to those of modern neurophysiology, it follows that Pavlov *theory* may usefully be discarded or drastically revised, while the brilliant experimental achievements remain as a great scientific contribution to psychopathology. The same limitation thus

XUM

applies to the 'physiologizing' of nervous system types and the three signal systems. This is far too simple an account of a brain function basis for individual variation. Recent attempts at explaining individual differences in terms of neurophysiology and brain anatomy have rightly been extremely cautious, in spite of, or perhaps because of, the vast amount of complex evidence obtained from human lobotomy and lobectomy studies.

SUMMARY AND CONCLUSIONS

Pavlov's positive contributions to psychological medicine may be summarily stated as follows:

1. A brilliant experimental analysis of the conditions and mechanisms of stress-produced disorganization of behaviour in animals, which has set going a vast amount of further animal research essential to the scientific foundation of psychopathology.

2. Extension, by analogy, of his conditioning principles to the higher levels of human behaviour, normal and abnormal, and including language and other skills; such extension, though inadequate, has the merit of being experimentally testable and theoretically modifiable, and has provided useful hypotheses for the clinician to apply to the complex phases of neurotic, psychosomatic and psychotic symptomatology.

3. Extension of the individual variation hypotheses derived from animal behaviour studies had the over-simplifying defect common to all typologies, whether Hippocratic, Kretschmerian or statistical-dimensional; but his observations focussed research attention upon temperamental variation in Man as a possibly crucial factor in determining differential patterns of habit formation.

The theoretical, aetiological and therapeutic deficiencies of the Pavlov system, when applied to human behaviour disorders, have themselves directly or indirectly stimulated much-needed research and clinical application. Assimilation of new, dynamic principles, and revision of the old, has been a necessary stage in scientific development. But Pavlov's greatest contribution lies in his use of the experimental method to elucidate the problems of human mental disorder in a strictly objective way. While his theoretical models may be deficient alike to the modern neurophysiologist and the modern learning theorist, his scientific goal of a truly experimental psychopathology, based upon the principles of the higher nervous activity, has been an inspiration to many workers in this difficult field of medical research.

OPSOMMING

Pavlov se positiewe bydraes tot die psigologiese geneeskunde kan kortweg soos volg saamgevat word:

1. 'n Skitterende proefondervindelike ontleding van die toestande en meganismes van deur spanning geproduseerde gedragsdesorganisasie by diere. Dit het 'n geweldige hoeveelheid diere-navorsing wat noodsaaklik vir die wetenskaplike grondslag van psigopatologie is, van stapel gestuur.

2. Uitbreiding, deur analogie, van sy kondisioneringsbeginsels op die hoër peile van menslike gedrag, sowel normaal as abnormaal, en insluitende taal- en ander bedrewenheid; sodanige uitbreidings, hoewel ondoeltreffend, het een belangrike voordeel: hulle kan deur middel van eksperimente getoets word en is teoreties wysigbaar, en het nuttige hipoteses verskaf wat die klinis nou kan toepas op die ingewikkelde fases van neurotiese, psigosomatiese en psigotiese simptomatologie.

3. Uitbreiding van die indiwiduele variasiehipoteses, ontleen aan studies van die gedrag van diere, word gekenmerk deur die oor-vereenvoudigingsdefek wat by alle tipologieë, Hippokraties, Kretschmeriaans of statisties-dimensionaal, aangetref word; maar sy waarnemings het die aandag van navorsers toegespits op die temperamentvolle variasie by die mens as 'n moontlik kritieke faktor by die vasstelling van die differensiële patrone van gewoontevorming.

Die teoretiese, etiologiese en terapeutiese tekortkominge van die Pavlov-stelsel, wanneer dit op versteurings van die mens se gedrag toegepas word, het self veel gedoen om hoogs nodige navorsing en kliniese toepassing regstreeks of onregstreeks te stimuleer. Die assimilasie van nuwe, dinamiese beginsels en die hersiening van oues was 'n noodsaaklike stadium in wetenskaplike ontwikkeling. Maar Pavlov se grootste bydrae lê opgesluit in sy gebruik van die eksperimentele metode om die probleme van geestesversteurings by die mens op 'n streng objektiewe manier toe te lig. Terwyl sy teoretiese modelle gebreke openbaar vir sowel die moderne neuropsigoloog as die moderne geleerde teoreticus, was sy wetenskaplike doelwit, d.w.s. 'n waarlik eksperimentele psigopatologie gebaseer op die beginsels van hoër senuweebedrywigheid, 'n besieling vir talle werkers op hierdie moeilike gebied van mediese navorsing.

REFERENCES

1. Airapetyantz, E. and Bykov, K. (1945): Philos. Phenom. Res., **5**, 577.
2. Eysenck, H. J. (1955): J. Ment. Sci., **101**, 28.
3. Frolov, Y. P. (1937): *Pavlov and his School: The Theory of Conditioned Reflexes.* London: Kegan Paul.
4. Hall, K. R. L. (1957): *Conditioning and Learning Techniques.* Chapter *in* Zubin, J. (Ed.): *Experimental Abnormal Psychology.* New York: Wiley.
5. Ivanov-Smolensky, A. G. (1954): *Essays on the Pathophysiology of the Higher Nervous Activity.* Moscow: Foreign Languages Publishing House.
6. Jones, E. (1953): *Sigmund Freud: Life and Work,* Vol. I. London: Hogarth.

XUM

7. Konorski, J. (1948): *Conditioned Reflexes and Neuron Organization.* Cambridge: University Press.
8. Konorski, J. (1950): *Mechanisms of Learning.* Chapter in *Symposium Number IV: Physiological Mechanisms in Animal Behaviour.* Society for Experimental Biology. Cambridge: University Press.
9. Liddell, H. S. (1949): *The Nervous System as a Whole: The Conditioned Reflex.* Chapter *in* Fulton, J. F.: *Physiology of the Nervous System,* 3rd ed. New York: Oxford University Press.
10. Pavlov, I. P. (1927): *Lectures on Conditioned Reflexes.* New York: International.
11. Pavlov, I. P. (1941): *Lectures on Conditioned Reflexes,* Vol. II: *Conditioned Reflexes and Psychiatry.* New York: International.
12. Sargant, W. (1957): *Battle for the Mind.* London: William Heinemann Ltd.

NOTES AND NEWS

Dr. I. Bersohn, formerly Assistant Superintendent, Clinical Pathology (South African Institute for Medical Research) has been promoted to the post of Deputy Superintendent of the Diagnostic Department of the Institute.

Dr. Joyce Ordman has commenced practice as a Specialist Anaesthetist at 401 Ingram's Corner, Twist Street, Hillbrow, Johannesburg. (*Telephones*: *Rooms*: 44-9688; *Residence*: 41-1207).

PREPARATIONS AND APPLIANCES · PREPARATE EN TOESTELLE

LEDERKYN (SULFAMETHOXYPYRIDAZINE) LEDERLE

A NEW LONG-ACTING SULPHONAMIDE

Lederkyn (sulfamethoxypyridazine), marketed in the U.S.A. under the name of *Kynex,* is now available in South Africa.

Lederkyn is a new sulphanilamide derivative with anti-bacterial activity equal to that of sulphadiazine, but with an adult dosage requirement of 1 g. (2 tablets) as a loading dose and thereafter one 500 mg. tablet per day. The dosage of *Lederkyn* is therefore one quarter to one eighth the recommended dose of most anti-bacterial sulphonamides. This low dosage has the approval of the U.S.A. Food & Drug Administration.

Lederkyn, on this dosage, produces higher-than-normal blood concentrations through a combination of high assimilation from the gastro-intestinal tract and a slow rate of excretion from the blood stream into the kidneys. *Lederkyn* is also reported to penetrate into the cerebro-spinal fluid in higher concentrations than is usual with other commonly employed sulphonamides. Because of the slow rate of renal excretion, urine concentrations are very unlikely to reach a level that could cause renal damage.

Lederkyn, in articles already published or pending, has been reported to have proved of value in urinary infections, bacterial respiratory infections, dysentery and as a prophylactic measure in rheumatic heart cases.

Lederkyn will only be marketed for the present in bottles of 12 tablets of 500 mg. per tablet. It is expected that a pack of 100 tablets and a syrup for paediatric use will be marketed in the near future.

Distributors: Alex. Lipworth, Ltd., P.O. Box 4461, Johannesburg.

LEDERKYN (SULFAMETOXSIPIRIDASIEN) LEDERLE

'N NUWE SULFONAMIED MET 'N LANGDURIGE EFFEK

Lederkyn (sulfametoksipiridasien) wat in die Verenigde State onder die handelsnaam *Kynex* bemark word, is tans in Suid-Afrika verkrygbaar.

Lederkyn is 'n nuwe sulfanilamiedderivaat met 'n bakteriebestrydende aktiwiteit gelykstaande aan dié van sulfadiasien, maar met 'n dosisvereiste (in die geval van volwassenes) van 1 g. (2 tablette) as 'n ladingsdosis, en daarna een tablet van 500 mg. per dag. M.a.w., die dosis *Lederkyn* is net 'n kwart tot een-agste van die dosis wat in die geval van die meeste bakteriebestrydende sulfonamiede aanbeveel word. Hierdie lae dosis word goed gekeur deur die Verenigde State se Voedsel- en Geneesmiddeladministrasie.

Sodanige dosisse *Lederkyn* produseer hoër as normale bloedkonsentrasies deur hoë assimilasie uit die spysverteringskanaal gepaard met stadige afskeiding uit die bloedstroom in die niere in. Daar word ook berig dat *Lederkyn* die serebro-ruggraatvloeistof binnedring in hoër konsentrasies as wat gebruiklik is met die ander sulfonamiede wat gewoonlik voorgeskryf word. Weens die stadige tempo van nierafskeiding is dit onwaarskynlik dat die urinekonsentrasies 'n peil sal bereik waar hulle die niere kan beskadig.

In artikels wat reeds gepubliseer is of binnekort gepubliseer sal word, word daar berig dat *Lederkyn* van waarde was by die behandeling van urinêre infeksies, bakteriese infeksies van die asemhalingstelsel, disenterie en ook as 'n profilaktiese middel in gevalle van rumatiekhart.

Op die oomblik is *Lederkyn* slegs verkrygbaar in bottels bevattende 12 tablette van 500 mg. elk. Daar word verwag dat 'n bottel van 100 tablette sowel as 'n stroop vir pediatriese gebruik in die naaste toekoms beskikbaar sal wees.

Verspreiders: Alex. Lipworth, Ltd., Posbus 4461, Johannesburg.

CALADRYL* quickly and effectively relieves hot weather skin irritations, such as heat spots, sunburn, rashes, insect bites and nettle stings. It combines the soothing, mildly-astringent action of calamine with the anti-pruritic, anti-allergic effects of Benadryl*. Supplied as a smooth, non-greasy lotion or as a water-miscible cream, Caladryl provides symptomatic treatment for irritative skin conditions, whether of allergic or non-allergic origin.

**Trade Marks*

CALADRYL

LOTION—*In bottles of* 4 *and* 80 *fluid ounces*
CREAM—*In tubes of approximately* 1½ *ozs.*

MEDICAMENTA VERA

PARKE DAVIS LABORATORIES (PTY.) LIMITED

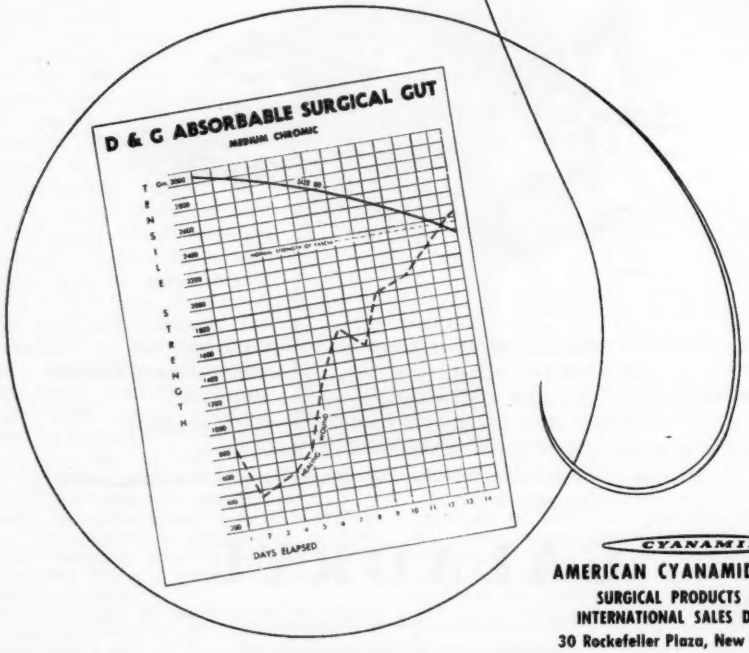
P.O. Box 9971, Johannesburg and at Port Elizabeth *Distributors in South Africa:* Lennon Ltd., all branches.
Distributors also in Rhodesia and Nyasaland, Belgian Congo, Angola, Mocambique and East Africa

XUM

THE CRITICAL FIRST FOUR DAYS

Surgeons can depend on D&G "Timed-absorption" catgut to provide greater suture support during the critical first four days following surgery when wound strength comes almost entirely from the suture.

1 2 3 4



CYANAMID
AMERICAN CYANAMID COMPANY
SURGICAL PRODUCTS DIVISION
INTERNATIONAL SALES DEPARTMENT
30 Rockefeller Plaza, New York 20, N. Y.

Davis & Geck Quality Sutures Since 1909

Distributors: **Thackray Products (Pty.) Ltd.,** 108 - 110 Medical Centre, Heerengracht, Cape Town.
23 Orion House, 235 Bree Street, Johannesburg.

SOPENTAL
is indicated . . .

INSOMNIA. In those cases of insomnia where the patient experiences difficulty in getting off to sleep, SOPENTAL has an advantage over other barbiturates, since its short action is less likely to leave the patient in a state of depression during the morning following administration. The normal dosage employed is one or two tablets (in the average patient one tablet is sufficient) immediately before retiring.

PREOPERATIVE TREATMENT. SOPENTAL may be used as a basal anaesthetic prior to surgical operation, its sedative effect minimizing the amount of general anaesthetic required. In these cases the normal procedure is one tablet the evening before operation, a further tablet two hours before, and, if necessary, a third tablet one hour before operation.

OBSTETRICS. SOPENTAL may be employed for the production of obstetrical amnesia, where the optimum dose is that which reduces pain without depressing uterine contractions. Here it is usual to start with one tablet at the commencement of labour, repeating the dose, when necessary, up to a maximum of five tablets.

ACTION AND USES. SOPENTAL is one of the more rapidly acting barbiturates, but its duration of action is short.

SOPENTAL is the mono-sodium derivative of 5-ethyl-5-(1-methyl-butyl)-barbituric acid.

SOPENTAL is almost completely destroyed by the liver, and is therefore useful in cases of impaired renal function.

SOPENTAL is issued as tablets of Pentobarbitone Sodium 1½ grains in each, in bottles of 40 and 500.

Manufactured in South Africa by

PETERSEN'S ETHICAL PRODUCTS STANDARDISED

PETERSEN LIMITED

Established 1842

P.O. Box 38 CAPE TOWN
P.O. Box 2238 SALISBURY
P.O. Box 1684 DURBAN
P.O. Box 5785 JOHANNESBURG
P.O. Box 1200 BULAWAYO
P.O. Box 1005 BLOEMFONTEIN

240-3-E-PS

the new improved..
BIRTCHER
HYFRECATOR

An old and trusted friend in a new and improved form. Over 100,000 Hyfrecators are in daily use throughout the world for the permanent removal of warts, superfluous hair and other unwanted growths, as well as for cervical coagulation.

This small compact unit, which hangs in the surgery ready for instant use, has proved its worth to General Practioners and Specialists over and over again.

The new improved model offers double the power, easier adjustment and smoother control of current at all power levels.

PRICE: £29-10-0 complete for all techniques including cervical cautery. (D.C. model also available at slightly higher price.)

Write for free booklet "A Symposium on Electro-desiccation and Coagulation" to-day, or ask your favourite Surgical House for a demonstration.

Available from all reputable Surgical Dealers or from the Sole Distributors:

DISMED

Medical Distributors (PTY.) LTD.

P.O. 3378 JOHANNESBURG Telephone 23-8106
236 Jeppe Street
and at
216-217 Boston House, Strand Street, Cape Town
Telephone 3-4608

XUM

For Infant Feeding...

Pelargon

FULL CREAM ACIDIFIED MILK

. . . is an acidified, full cream, powdered milk with added carbohydrates for the feeding either partially or completely of healthy babies from birth onwards. It is also recommended in cases of vomiting and Marasmus, Skin Disorders, Dyspepsia, Diarrhoea and is specially suitable for the feeding of the premature infant.

For further information and literature write to Nestlé's Medical Service, P.O. Box 1568, Durban.

PERCENTAGE COMPOSITION (Dry Powder)

FAT	PROTEIN	LACTOSE	MINERAL SALTS	SUCROSE (added)	MALTO DEXTRIN (added)	STARCH (pre-cooked)	LACTIC ACID	MOISTURE
17	16.5	23.5	4.3	12.5	12.5	8.5	2.2	3

P-256

A NESTLÉ'S PRODUCT

THE PROBLEM OF

EUROPEAN PROSTITUTION

IN JOHANNESBURG

A Sociological Survey by Dr. Louis Franklin Freed,
(M.A., M.D., D.Phil., M.B., Ch.B., D.P.H., D.T.M. & H., D.P.M., F.R.S.S.Af.)

Chapter

I Introductory
II The Nature of the Prostitute and of Prostitution
III The Prostitute and Her Collaborators
IV The Prostitute and Her Clients
V The Prostitutes Themselves
VI The Prostitutes Themselves (continued)
VII Prostitution and its Evils
VIII Prostitutes and their Families
IX The Prostitute and the Community
X Social Control
XI Social Control (continued)
XII Social Control (continued)
XIII General Conclusions · Recommendations · The Prospect

Appendices: Questionnaires · Schema of Venereological Examination Employed Schema of Sexological Examination Employed · Glossary · References · Index

Price 41/3 (Postage 1/6)

Juta & Co. Limited

P.O. Box 30 · Cape Town : **P.O. Box 1010 · Johannesburg**

Order Form

To: Juta and Co. Limited, · P.O. Box 30, Cape Town · P.O. Box 1010, Johannesburg

Please forward.....copy/copies of "*The Problem of European Prostitution in Johannesburg*" by L. F. Freed, price 41s. 3d. (Postage 1s. 6d.)

I enclose my remittance. Kindly debit my account*.

Name.....

Address.....

.....

*(Please delete words not required)

(J.Fr.H.)

XUM

THE CENTURY OF THE SURGEON

By Jürgen Thorwald

The author assumes the identity of an American doctor born about 1820 and tells the story of his life. He travels extensively—to India to see a famous Indian surgeon operating for stone. Himself a victim of the same disease, he seeks relief at the hands of Civiale, the famous surgeon in Paris. When ether anaesthesia is discovered by Morton, the author, as a medical student, is present when it was being tried out by John Collins Warren in Boston. He watches Sir Henry Thompson, the famous urologist, working in London and Carpue in Paris restoring a destroyed nose by plastic surgery. When James Young Simpson discovers chloroform anaesthesia, the author is present, and he describes the events of the Crimean War as seen in the Turkish Barracks at Scutari. Robert Liston, Semmelweiss and Lord Lister are all encountered and described by their fictional colleague. Robert Koch and Louis Pasteur are assessed and discussed in a most scholarly, accurate and absorbing fashion.

'Any truly comprehensive history of medicine has to be partly social history . . . Thorwald has solved this by no means easy task in masterly fashion. His soundly and exhaustively researched *Century of the Surgeon* opens up interesting vistas to the specialist. Through its fluent, sparkling presentation, however, it also gives the general reader an introduction to the basic problems. The scientific soundness of the work is attested by the copious and exhaustive list of sources. This is a work of medical history of unusual excellence'—Professor Werner Forssmann, *Recipient of the Nobel Prize for Medicine.*

ORDER FORM *To:* **Juta & Co. Limited**

P.O. Box 30, Cape Town. P.O. Box 1010, Johannesburg.

Please forward.....copy/copies of *The Century of the Surgeon*, by Jürgen Thorwald, price 25s. 6d. (Postage 1s. 3d.)

I enclose my remittance. Kindly debit my account*.

Name .....

Address .....

.....

* (Please delete words not required)

VIADRIL*

Hydroxydione sodium

THE WORLD'S FIRST STEROID ANAESTHETIC

"an entirely new general anaesthetic . . . it bears no resemblance to any group of drugs hitherto used or contemplated for this purpose." Lerman, L. H. (1956) **Brit. Med. J.** ii, 129.

It would be of limited value, to say the least, to quote only a few of the many comments on Viadril by leading authorities. However, we will readily make available to you on request the fullest possible information about this important medical advance.

SIMPLIFIED INTUBATION . . .
little—if any—effect on respiration . . .
no hormone effect . . .

Viadril is an intravenous steroid anaesthetic, structurally related to the steroid hormones, but without hormonal effects. Since its development by Pfizer investigators 3 years ago, Viadril has been extensively studied in the laboratories and hospitals of important medical centres throughout the world. Used during thousands of operations of all kinds, Viadril has proved to be in many ways a distinct advance over anaesthetics in common use.

Viadril induces anaesthesia by depressing the central nervous system. A basal anaesthetic state is maintained for the duration of the operative procedure. In contrast to other agents, Viadril has no significant cardiac or respiratory effect. Respiratory control can be easily instituted by the anaesthetist at will. Thus Viadril is extremely useful in intrathoracic procedures.

Unlike other basal anaesthetics, Viadril inhibits peripheral reflexes, effectively obtunds laryngeal and tracheal reflexes to make intubation feasible without relaxants. Adjuvant muscle relaxants, when required at all, can be reduced to one-third or one half the usual dose.

Pfizer

Medical Enquiries:

PFIZER LABORATORIES South Africa (Pty.) Limited

P.O. Box 7324, Johannesburg

* Trademark of Chas. Pfizer & Co. Inc.

XUM

The new nitrofuran

FURADANTIN

BRAND OF NITROFURANTOIN

a specific for urinary-tract infections

FURADANTIN
broader spectrum

'Furadantin' is effective orally against most pathogens found in urinary-tract infections, ***including strains notorious for their resistance to antibiotics and sulphonamides.***

FURADANTIN
rapid action

'Furadantin' acts rapidly in the urinary-tract. It produces therapeutic concentrations in the urine within 30 minutes of ingestion.

FURADANTIN
safety

'Furadantin' is remarkably free from serious side-effects, and its high solubility in urine makes the risk of crystalluria remote. 'Furadantin' has been used with great success in urinary-tract infections of children.

Each tablet contains 50 mg. Nitrofurantoin [N-(5-nitro-2-furfurylidene)-1-aminohydantoin]
In containers of 25

SKF Laboratories (Pty) Ltd, Diesel Street, Port Elizabeth

Licensees of The Norwich Pharmacal Company, U.S.A. Brit. Pat. Nos. 679202, 757822 and 765898

'Furadantin' is a trade mark

PR:PA975A

tomorrow's sulfa today!

LEDERKYN

SULFAMETHOXYPYRIDAZINE

Lederle

An entirely new, soluble, single sulfonamide developed by Lederle, LEDERKYN sulfamethoxypyridazine sets a new standard for sulfa therapy:

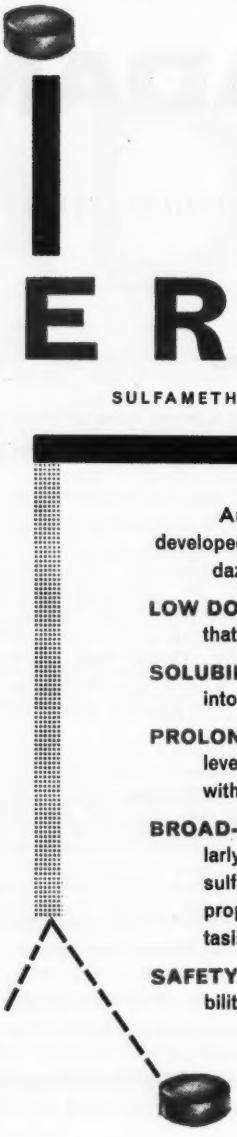
LOW DOSAGE — Dosage reduced to a fraction of that of other currently available sulfonamides.

SOLUBILITY — Prompt absorption, good diffusion into body fluid and tissue.

PROLONGED ACTION — Therapeutic blood levels within the hour, concentration peaks within two hours.

BROAD-RANGE EFFECTIVENESS — Particularly effective in urinary tract infections due to sulfonamide-sensitive organisms, and in the prophylaxis of rheumatic fever and bronchiectasis.

SAFETY — Based on low required dosage, solubility, slow excretion rate.



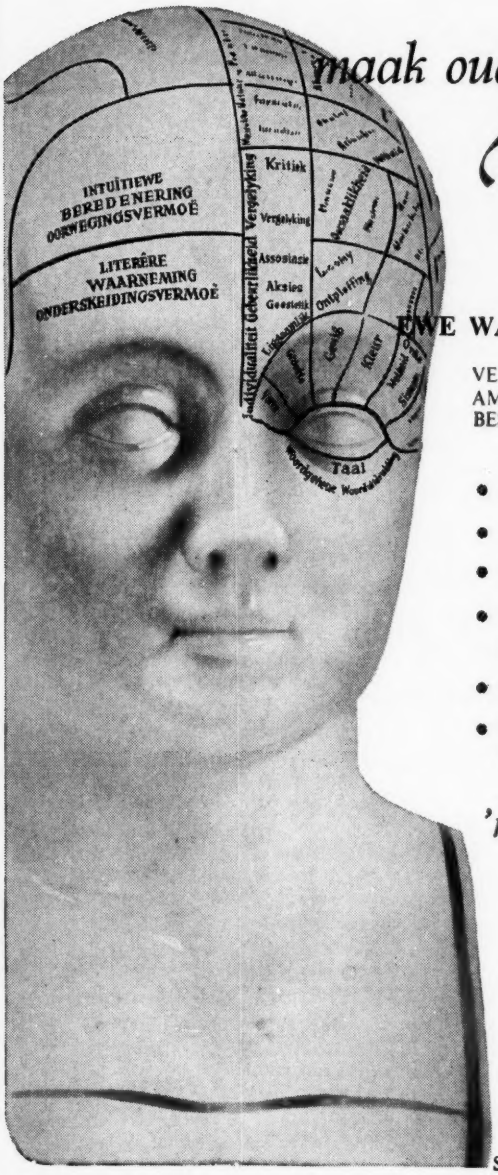
Packages:
Bottles of
12 and
100 tablets.

LEDERLE LABORATORIES DIVISION, AMERICAN CYANAMID COMPANY, 30 ROCKEFELLER PLAZA, NEW YORK 20, N.Y.

Sole Distributors for South Africa and Central African Federation:

ALEX. LIPWORTH LTD., JOHANNESBURG, CAPE TOWN, PORT ELIZABETH, DURBAN AND SALISBURY

die kalmeermiddel van volle omvang met opmerklik-verhoogte vermoërykheid



maak ouer begrippe ou-modies...

Trilafon*

(Tril'-a-fon uitgespreek) perfenasien

EWE WAARDEVOL BY

VERONTRUSTE GEHOSPITALISEERDE SIELSIEKES
AMBULATORIESE PSIGONEUROSELYERS
BESORGDHEID EN GESPANNENHEID

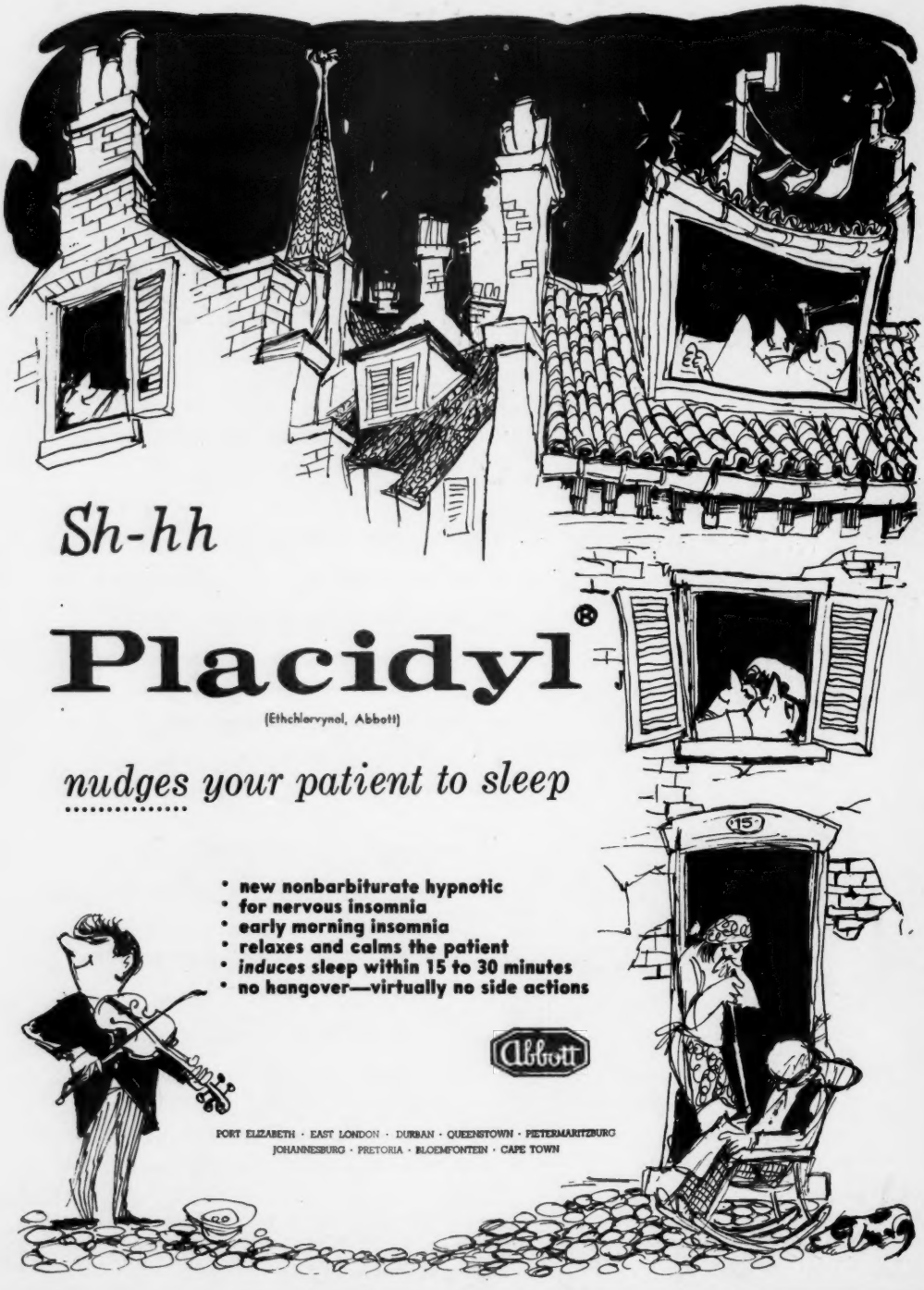
- geelsug opmerklik seldsaam
- noemenswaardige hipotensie feitlik onbekend
- geen agranulositose aangemeld nie
- fotosensitiwiteit van vel onopgemerk nog proefondervindelik veroorsaak
- stuwing van neusvliese ongewoon
- ligte slaaploosheid en motoriese rusteloosheid seldsaam

'n onoortroffe vermoëryke brakingsbestrydingsmiddel

Verpakking: TRILAFON Tablette: 2, 4, 8 en 16 mg.

SCHERING CORPORATION
BLOOMFIELD NEW JERSEY

SCHERAG (EDMS.) BPK., POSBUS 7539, JOHANNESBURG



Sh-hh

Placidyl®

(Ethchlorvynol, Abbott)

nudges your patient to sleep

- **new nonbarbiturate hypnotic**
- **for nervous insomnia**
- **early morning insomnia**
- **relaxes and calms the patient**
- ***induces* sleep within 15 to 30 minutes**
- **no hangover—virtually no side actions**

Abbott

PORT ELIZABETH · EAST LONDON · DURBAN · QUEENSTOWN · PIETERMARITZBURG
JOHANNESBURG · PRETORIA · BLOEMFONTEIN · CAPE TOWN

Published by the Proprietors Juta and Co. Ltd., 43 Pritchard Street, Johannesburg, and printed in the Union of South Africa by Cape Times Limited, Parow, C.P.

XUM